The Best of the

JOURNAL

of the Travellers' Aid Society

Volume 1

317

Selected Articles
Collected from Journals 1 to 4

the JOURNAL of the Travellers' Aid Society

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Dates in these issues of the *Journal* are given in accordance with an arbitrary Imperial calendar of 365 days. The expression of date consists of a three-digit day number followed by a dash and a four-digit year number (showing the current year since the founding of the Imperium.

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From the Management

In its first year, the *Journal of the Travellers' Aid Society* achieved great popularity, due in large part, we feel, to the excellence of the articles in those first four issues. In response to great popular demand, we are issuing an anthology of selected articles from the Journal's first year. In volume one, the Journal published thirty-five articles dealing with Traveller and other Science-Fiction games. Trying to decide which of these thirty-five to include was a difficult task. Two main criteria were used in deciding: what will be most in demand and what will be or has already been reprinted elsewhere? After weeks of consideration, we finally came to what we feel is the optimum selection.

One of the most popular features of the Journal's first year was called *Amber Zone.* Named from the notion that the Imperium might code maps of its territory to indicate relative danger to visitors (green for safe, red for prohibited, and amber for proceed at own risk), Amber Zones are complete, ready-to-use adventures for use as is, or to provide an inspiration for a referee to devise versions suited to his or her individual universe.

Another popular feature was the *Bestiary.* The Bestiary provided descriptions and illustrations of selected animals which, like the Amber Zones, could be used straight or modified to suit.

The *Ship's Locker* provides descriptions of new equipment which players and referees might find of interest, as well as closer looks at standard equipment.

The Journal also published several feature articles dealing with subjects as diverse as interstellar trade and economics, robotics, mining asteroids, and the deck plans of starships.

In *The Best of the Journal, Volume I,* we have reproduced the articles as they were originally printed (even including the typos). The singular exception is the Robots feature, which has been slightly revised and abridged from the original, and reprinted as a single article instead of three separate sections.

In *From the Management,* we have often covered subjects which we felt needed to be brought to the attention of the readership at large. In issue 4, we dealt with a question often asked by Traveller players . . . Why did you include so many "obsolete" weapons in the rules?

For completeness, Traveller is forced to include a wide variety of weapons such as swords, knives, spears, and other "primitive" weapons. Dealing with primitive cultures, players could find themselves involved in a fight with a group armed with such weapons, and the rules must cover the use of edged weapons, spears, and such.

Another major consideration is law level. American technology produced nukes, artillery, napalm, machineguns, and dozens of other lethal devices, but the law level makes most of these unavailable and places obstacles in the way of the purchase of the rest. Anyone, however, can get a knife or a tire chain or a louisville slugger. A significant number of killings every year are accomplished with weapons that a

caveman would have no trouble with.

As far as the military goes, tradition and esprit de corps can be used to justify the inclusion of some blade training. Perhaps arbitrarily, marines in Traveller receive training in the cutlass as a service skill; it's justified as a morale building effort, like bayonet training in the US Army (I received bayonet training, hell, I *gave* bayonet training, and the army hasn't used bayonets in any real action since 1918). Officers in armies all over the world were taught fencing long after it ceased to have any military significance. Over and above all this, some training is still given in the use of the knife because it is one of the more efficient ways to kill silently, always of use to commandos and the like.

Finally, both players and referees should keep in mind that old fashioned weapons are not really designed with the idea that characters will depend on them for their lives. Guns, even without skill, are more efficient in most situations and can be used to great effect. Blade skill is a background skill, and should be put to good use only where it is needed.

Marc Miller

In *From the Management,* issue 2, we discussed laser pistols . . .

Although it does not specifically mention them, Traveller provides all the information necessary to enable a referee to create them, with a little mental effort. Since, as referee, we are running the world, we declare that a laser pistol should be to a laser carbine as a conventional pistol is to a conventional carbine. A conventional pistol usually has no shoulder stock, and has a shorter barrel than a conventional carbine. Pistols often have lower powered cartridges, even if the caliber is the same, but this is not always true. As the pistol's barrel is shorter, the sight radius is also shorter, and the pistol is less accurate at a given range than the carbine. The general principles of operation are the same for both weapons.

Referring to book 1 (pp. 35-37), we find that a laser carbine is 800 mm long, weighs 5000 grams, has a power pack which enables it to fire 50 shots before recharging, and costs Cr2500.

We decide that our laser pistol should be the same weight as an automatic pistol, but that the barrel should be only 100 mm shorter than the laser carbine. Subtracting 100 mm plus the length of a shoulder stock from the length of the laser carbine, we get a length of 350 mm, which is a little clumsy to handle, but we want it that way. For the purposes of firing, we will treat our laser pistol as if it were a laser carbine, but with a DM of -1 at medium and -2 at long range to reflect the fact that the lack of a shoulder stock makes it harder to aim. Note: If we wanted to make the laser pistol less clumsy, we could decrease the length of the barrel further, but we would then have to make the accuracy worse. We choose to make no change to the power pack (but, we could, if desired, make it weigh less, and radically reduce the number of charges it held, or make available more compact PP's at higher tech levels). Since most of the cost of the weapon is the "lasing" part of its innards, we set the cost at Cr2000.

Characteristics — Length: 350 mm. *Weight:* 750 grams. *Base Price:* Cr2000.

The above example indicates how the Traveller rules can be used to create something not present in the rules. We don't have room to describe everything. With a little imagination, a little research, and a lot of thought, almost anything can be incorporated into Traveller.

Loren Wiseman

Rescue on Ruie

RUIE (0209 - C776977 - 7) is a balkanized, industrialized, and very autonomous world on the frontiers of the Imperium. A former Lost Colony, it had worked itself up to tech level 5 by the time it was rediscovered by the Scout Service 31 years ago. Of its four major powers, Jingarlu and the Comors Union are now at tech level 7, and open for trade with offworlders (subject to local laws and customs). Both of these nations are very receptive to imperial citizens and the commercial contact they bring. Certain other areas, however, are hostile. One of these is Nebelthorn, a nation ruled by the same family for over 120 years. The rulers, the Family Eldenn, keep tight control over all offworld (and most international) contact, using various methods (nearly all distasteful) to discourage it. Nebelthorn's only notable resource is petrochemicals, and the country has prospered by selling oil and related products to other industrial customers. Following imperial recontact, however, offworld merchants began selling mass conversion fuel systems and vehicles to Jingarlu and the Union, Nebelthorn's largest customers. This led to a sudden dearth of both customers and income, plunging the economy into a depression which has continued for the last 12 years without signs of improvement. The Eldenns have blamed their plight on the Imperium, and their country has been posted as an **Amber** travel zone.

PLAYERS' Information: The players are in search of a patron, openly declaring their intentions as they make the rounds of bars and local establishments. They are contacted by Marc hault-Oberlindes, owner of Oberlindes Lines, through an agent. About a year ago, Sergei hault-Oberlines, Marc's 20 year old son, landed on Ruie as part of a Grand Tour, part-learning the business, and part-pleasure. After several days in Jingarlu he had heard of the Daccam Ruins, located in Nebelthorn. The Ruins are the site of an extinct alien culture of considerable interest to xenologists. Though warned of the Amber travel zone classification, Sergei insisted on going to them, and (through some devious means) obtained a visa. When he failed to return the crew of his ship (employed by the Lines) attempted to find out what had happened, only to run into a blank wall of hostility and indifference from the Nebelthornian authorities. Requests for entry visas were denied.

Despite every effort by Marc hault-Oberlindes, nothing more was heard for three months. At that time, Nebelthorn's ambassador to Jingarlu delivered an official communique to the imperial consul in Jingarlu, informing him that Sergei hault-Oberlindes, an imperial citizen, had been convicted of assaulting a member of the National Police and had been sentenced to 30 years at hard labor. No further word was sent, letters to Sergei have been returned, and all appeals and bribes have been refused. By spending a considerable amount, Marc hault-Oberlindes did manage to learn the following:

1. Sergei did, by Nebelthornian standards, receive a fair and legal trial for a genuine offense (he assaulted a cop). He signed a confession, and pleaded guilty.

2. He is currently held in Rustum Prison, a maximum security institution.

Marc hault-Oberlindes has obtained a map of the region of the prison, which sits atop a plateau deliberately kept free of vegetation. He has also obtained a map and recent photographs of the prison with various areas labeled.

The elder hault-Oberlindes wants his son freed, regardless of the consequences. To assist on this and as payment, he will give the players a surplus Oberlindes Lines free trader (type A), fueled and ready for travel. The players are instructed to keep a low profile.

REFEREE'S Information: The referee must think through the actual situation and provide a rough sketch of the prison, which should include—

1. Two outer fences approximately 15 meters apart.

2. An administration building, a troop barracks for approximately 50 guards, two large adjacent cellblocks, each holding 500 prisoners, and a smaller cellblock in a corner of the compound.

In addition, the following data is secret, for release at the proper time.

1. All fences in the prison are electrified; the outer to 11,000 volts (enough to inflict 16D hits on an uninsulated person), and the inner fence charged only enough to incapacitate (2D hits per round per touch). The 15m strip between them is heavily mined.

2. Sergei was imprisoned for striking a National Policeman who had manhandled a girl Sergei had met. She is also in prison, in the woman's cellblock in one corner of the compound.

3. Sergei can shoot (Rifle-2, Pistol-1) and will demand a weapon. He will then attempt to free the girl (he knows where she is) regardless of the odds.

vacc suit. He was able to escape through an ejection tube. As he closed his face plate he heard the navigator shout, "The money!" and the First Pilot reply, "No time!". Kinson watched as the damaged ship dropped toward a green planet below him. He was picked up a few hours later by the sole surviving Imperial ship. A total of four ships had been lost. Normally a court of inquiry convenes upon the loss of an Imperial ship, but instead Kinson was made to sign the Official Secrets Act and ordered to forget the whole affair. This unusual behavior aroused his curiosity, and he began snooping. It took time, but he found that his fleet had carried a quarterly fleet payroll: three months wages for all Imperial naval personnel in the sector. Imperial soldiers are (by old custom) paid in cash. The green planet below him had been Sharmun. Lastly, the scout which picked him up had detected neutrino emissions from a jump drive, indicating that Kinson's ship had reached the surface almost intact. Had news of the loss been released, hordes of treasure hunters would have descended on Sharmun. Kinson believes that the ship has not been found by the Sharmunese and that a small party would be able to find the money without being discovered.

Referee's Information:

The public data tapes have not been revised in 25 years. Sharmun is now at tech level 7. Both the collective and the Victors have space navies with efficient M-drive ships. They have colonized the two planets closest to Sharmun, and there is frequent traffic between the colonies and the home world. Both sides will assume the players' ship is hostile and shoot on sight.

The destroyer crashed into a lake in the Collective's territory. It has not been discovered. The lake is about 1 by 5 km. One long side is a swamp about 1 square km. On the other is a new Young Collectivist Camp, swarming with 400 well-scrubbed Y.C.'s 12 - 15 years old and 40 adult advisors. They are both sexes and wear cute red and white uniforms. There is a "Re-education Center for Enemies of the Collective" 20 km west of the lake. A city of 40000 population is 100 km to the south. Good highways link the youth camp, the concentration camp and the city. The area is heavily forested, but will not hide a scout ship. Twenty km north of the lake are rugged hills in which a scout ship can be concealed from all but direct overflight (camouflage net will block even that).

The ship is on its belly is 60 meters of water, bow up, about 150 meters from the swampy shore of the lake. The upper ½ of the ship still holds air, which will bubble to the surface if entry is forced, unless precautions are taken. Emergency lights still work, and several bodies are aboard, but there is evidence someone survived the crash.

The money (Cr 5000000 in soggy but otherwise undamaged bills) is underwater, in the rear cargo hold, in two crates, about 2 x 1 x 1 meters. The cargo hatches are buried in mud and corroded shut.

Both Sharmunese governements have only conventional radar, which can be scrambled by a scout's defence screens. The location of the wreck should not be revealed at first, although a scout ship has detectors which will be able to locate it in a few hours. The season when the players arrive will be mid-summer, and the lake will be extensively used for swimming, fishing, boating, and so on.

The referee should prepare a sketch map of the lake and the area around it, including the two camps, the swamp, the city, and the interconnecting road.

continued on page 15

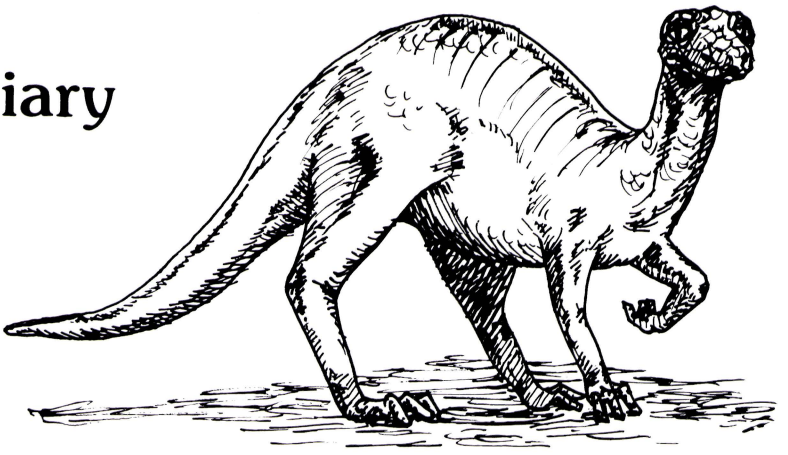
Sharmun (X-86787A-5 Red) is a lost colony on the a frontier section of the empire. It was re-discovered by the scout service in 1076. The team determined that the government of the planet was split between the Victor, a charismatic dictator, the Collective, a state similar to Stalinist Russia, and several other minor states which either the Victor or the Collective was in the process of annexing. Both states were totalitarian and militaristic, both possessed stockpiles of atomic and conventional weapons, and both were convinced that an all-out war was someday inevitable. Both cultures were found to be xenophobic in the extreme and paranoid. The scout service xenologists judged it to be 87% likely that overt contact would trigger a nuclear war, either due to mistaken identity or out of fear by one side or the other that their enemies would be able to surpass them. Covert contact was judged 91% likely to cause war if discovered. The planet was posted Red and interdicted to allow Sharmun to resolve its own destiny.

Players will be contacted by Kinson, an NPC scout who has a ship but no money. (scouts 11, 19, 21, 39, 27 or others from 1001 Characters are suitable if money is reduced to Cr 250 or

Amber Zone

less and a scout ship is assumed). Kinson will tell them that 11 years ago he was loaned to the navy for a top-secret mission. Despite the secrecy the small navy fleet was attacked without warning as it swung through a planetary system to refuel. Kinson's ship, a destroyer, took multiple missile hits. It depressurized and lost control. Kinson had just completed some EVA and was wearing a

The Bestiary



Bush Runners

(Suffitifer andrewsii, et al)

Adult bush runners weigh approximately 50 kg and are between 1.4 and 1.5 meters in length. Physically, they resemble a cross between the terran kangaroo (*Macropus* and others) and the etan fruit-lizard (*Fructoraptor*).

The skeleton is calciferous, internal, and differs from the typical terran vertebrate only in minor details.

Bush runners are bipedal, using a muscular pair of hind legs for locomotion, and a smaller pair of forearms for food acquisition and a long tail as a balancing organ during running, as a third leg when assuming an upright posture, and as a weapon when threatened.

The head is a typical arrangement of brain surrounded by a bony cranium upon which are laterally paired sensory organs (eyes, nose and ears), as well as a ventrally located mouth. The teeth are arranged in common fashion for omnivores (dental formula 2-1-2-2) and are faced on their grinding surfaces with a silicate material rather than the enamel of terran organisms.

Respiration is the usual O2/CO2 exhange accomplished by paired lungs located in the upper body cavity. The circulatory system is closed, the heart is four-chambered and the blood gases are transported by a copper based haemoglobin, which make the blood blue in color.

Bush runners are omnivorous and eat fruits, nuts, grubs, and such small animals as they can catch. They can usually be found on the edges of forested regions, semi-forested savannahs, and areas such as bogs where fruit-bearing plants grow in profusion.

Bush runners congregate in family groups of two parents and from 6 to 12 juveniles in various stages of development. There are two sexes, which pair for life, producing 2 to 3 young per season. Depending on the length of the local year, bush runners will have from 1 to 3 litters per mating season.

Bush runners mate do not breed well in captivity, so most specimens occur in the wild. Their meat is quite succulent and a deep blue in color. Large quantities in a short period of time are poisonous, however, so the meat is usually used as a colorful garnish for certain gourmet dishes.

Adult bush runners of both sexes produce a musk from certain glands located in the tail during mating season; this musk contains a compound called suffitoleum, used in the manufacture of expensive perfumes. The compound

has resisted all attempts to synthesize it, and the musk of animals raised in captivity does not contain it. Therefore, on most planets which have bush runners, the animals are allowed to range free and are hunted (under strict licensing arrangements) for the 2 to 5 grams of suffitoleum that can be recovered from each adult.

Tree Kraken or Land Squid
(Hexapoda strenii, H. silvans)

The tree kraken is native to the planet Forboldn, but for various reasons can be found on many small, low gravity worlds.

The adult tree kraken weighs 6 kilograms and resembles in general body form the octopus (q.v.), having a central body sensory cluster and six radiating tentacle-like arms.

The internal skeleton is rudimentary, consisting of a cartilaginous stiffening of the body to permit the lung sacs to function, to serve as attachment points for the muscles, and to permit leverage for the three part mandible located at the base of the arms.

The arms of the kraken consist of a stiffened central support structure surrounded by a muscular sheath. The arms end in from 2 to 7 (depending on species) smaller appendages. The ventral surface of the arm, and the ends of these smaller appendages are equipped with a disk-shaped sucker-like organ covered with hundreds of small, razor-sharp tooth-like structures.

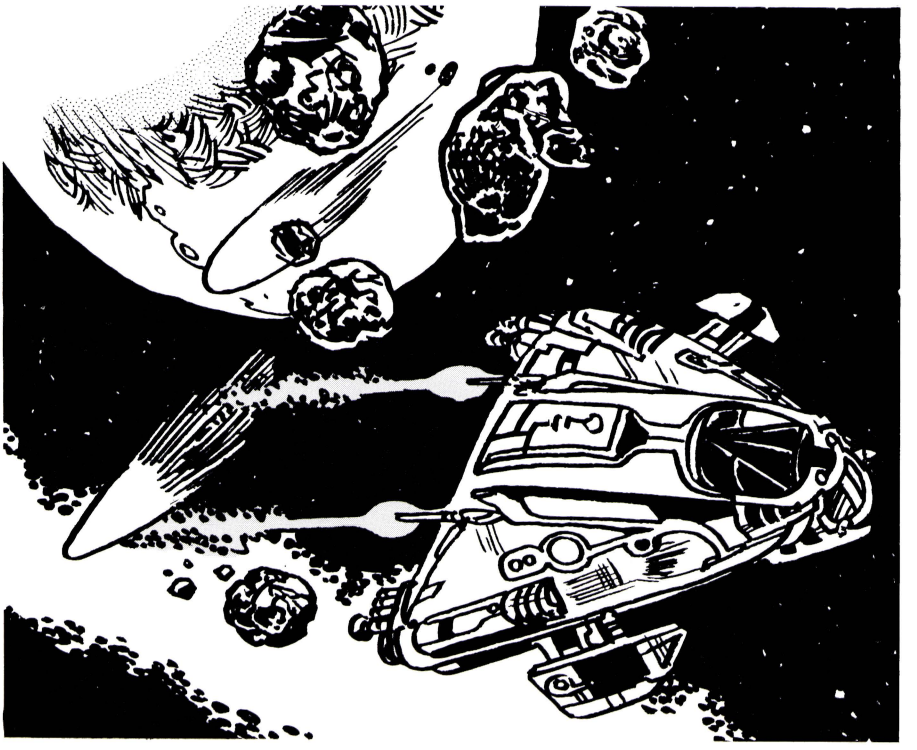
The eyes are paired, operate stereoscopically, and permit the kraken to detect the faintest movement at several hundred meters. Range judgement is extremely good.

Respiration is accomplished by 3 to 8 (varying with species) lung-sacs located in the body mass. Each sac has its own connection to the atmosphere. To function, the inner lining of each sac must be kept moist, requiring the kraken to remain in regions of high humidity, such as marshes, swamps, or jungles. Tree krakens have a closed circularory system and are endothermic.

The kraken attacks its prey by leaping upon it from a height, usually a tree, but often a cliff and occasionally a roof. The arms wrap around the prey, immobilizing it and the disk-shaped structures abrade the skin and other tissue into small fragments which are then conveyed to the mouth.

After feeding, the tree kraken climbs to a high place for protection from other predators, and goes into a digestive torpor, from which it emerges several hours later.

Krakens are hermaphroditic, and reproduction is accomplished by budding. During the six week mating season, two krakens will meet, and exchange genetic material by means of two tubelike structures located above the eyes. After fertilization, these structures swell to several times their normal size and grow arms, eventually (after eight to twelve weeks) becoming fully developed miniature krakens. When fully developed, the young detach themselves and go their own way. This is accomplished when the parent is in a state of torpor after feeding, and krakens will eat their own young.



Players' Information:

P-4836 is a small planetoid in the belt of the Rabwhar system (planetary characteristics: C000219C). The planetoid is owned by Sternmetal Horizons, LIC, which uses it for top secret experimental purposes.

The players are approached by a representative of an unnamed firm which wishes to retain a small group of people for a descrete mission. Sternmetal and several other megacorporations have bid on an Imperial contract which will be worth billions of credits to the winner. Sternmetal is rumoured to have developed a new and innovative manufacturing process which will enable them to reduce costs by 5 - 7% per unit. This may seem small, but it will mean a savings of several million credits in the long run, and will enable Sternmetal to submit the lowest bid. The precess was developed on P-4836 and the patron has determined that, for security reasons, its details are being kept there, stored in the experimental stations computer. The patron offers Cr 1000000 if the players can penetrate the defenses of P-4836, copy the details of the manufacturing process, and turn the information over to him, without being discovered.

Amber Zone

Referee's information:

The patron provides the following additional information upon acceptance of the mission.

The starport at P-4836 is of a size equivalent to a C class starport, but with the difference that refined fuel is available. It is a private installation, and unauthorized ships are not permitted to land. Outside vessels (those not owned by Sternmetal) sometimes dock at P-4836, carrying supplies and new

personnel for the station, but the crews are not permitted to enter the station proper, and rigorous security checks are carried out on any employee entering or leaving the station (obviously, the unnamed firm has been unable to suborn a Sternmetal employee, or they wouldn't need to hire the players).

Imperial regulations require all but purely military spaceports to permit ships in distress to dock.

The experimental station has a staff of 189, of which 126 are Sternmetal researchers, 34 operate the starport and its facilities, and 29 are security personel. These last are organized as follows:

Security Platoon:

Chief of Security— Acts as platoon leader, armed with automatic pistol and ballistic cloth armor.

Assistant Chief of Security— Acts as assistant platoon leader, armed with automatic pistol and cloth.

First Squad— This consists of a squad leader (sergeant) and two fireteams (1 corporal and three privates). Each of these is equipped with a gauss rifle and cloth armor.

Second Squad— Same as first squad.

Third Squad— Same as first squad.

Each squad is on duty for 8 hours and off duty for 16. One fire team of the two on duty at any given moment is in battle dress. During security alerts and inspections, the whole security platoon is called to duty.

In addition to the regular staff, the station maintains several spaceships for the defense of the station and for the escort of visiting bigwigs. The precise nature of these is left up to the referee to determine, depending upon the size of the adventurers' party and the type pf ship they enter system with. The players should have a clue to the number and types of ships present, but they should not have complete knowledge of them.

Once having penetrated the defenses of the station, the players locate the station's main computer and extract the desired information from it. The patron can provide enough information for a character with computer expertise to know what to look for, and to have a chance to circumvent the computer's security programming. The base chance of the computer alerting the security force should be determined by the referee, with appropriate DM's added or subtracted for computer skill or lack of it.

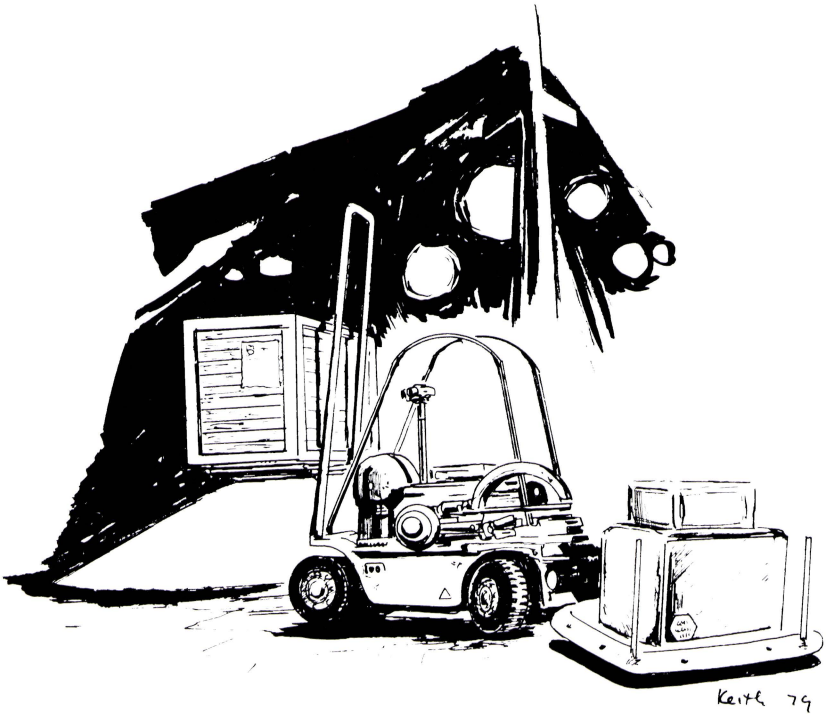
If the players seem to be having too easy a time of it, the referee should implement one or two unexpected variables, such as a surprise inspection by high officials of Sternmetal, a security alert, or another team, hired by a second unnamed firm. The referee should also decide at the outset whether or not the information is in the computer to begin with. The patron, of course, will not pay if he does not receive the data.

BESTIARY

ENCOUNTER TABLE ENTRIES (continued from page 9)

Animal Type	*Weight*	*Hits*	*Armor*	*Wounds and Weapons*
Bush Runner (Gatherer)	50 kg	19/6	cloth-1	5 thrasher F4 A8 S4
Tree Kraken (Pouncer)	6 kg	2/6	none	5 teeth A0 F0 S1

The information in these entries follows the general format of *Supplement 2, Animal Encounters.* The Tree Kraken appears in Supplement 2 on page 10, Jungle terrain, item 11.



Trade and Commerce

A number of people have argued that there will be no basis for trade as we know it in the far future. A world is generally possessed of sufficient and diverse resources that it will not have to import raw materials. Manufactured goods from its own tech level can be produced more efficiently locally, and there would be little demand for goods of lower tech levels. Worlds of high tech levels can avoid the raw materials problem almost entirely with sophisticated synthesis techniques. In terms of trading its manufactured goods to a lower tech level world, what does a low tech level world have that a high tech level world wants?

The difficulty with this argument is that it rests on the assumption that trade is the result of primitive manufacturing techniques, which it is not. Trade is the result of economic imbalance. The development of improved manufacturing, synthesizing, and energy generating processes will not spell the end of trade, so long as the rate of technological development is not evenly distributed. The important consideration is not what a tech 4 world would have that a tech 10 world wants; it is instead how much of its material wealth a tech 4 world is willing to give to obtain access to tech 10 goods.

The answer to this question provides the basis for any system of trade — the have-nots are willing to give a relatively high proportion of their wealth to obtain items beyond their capabilities to produce locally. In the context of Traveller, low tech level worlds are willing to trade a large number of their native products to obtain a small number of products of a higher tech level. This will result in a generally

higher standard of living in the higher tech level worlds, which is reflected by higher incomes (and prices) in absolute terms. Rather than generate separate tables of prices and incomes for each world, the easiest way to handle this is with currency exchange rates.

The exchange rate system proposed here is based on two variables: tech level and starport type. The assumptions are that the lower a planet's tech level and the more primitive its facilities, the more it is in need of more sophisticated goods. The table assumes a maximum normal tech level of 15 in the Imperium. The basic currency of exchange is the Imperial Credit (generally referred to as an Imperial). All currencies are listed in their percentage value of an Imperial. Thus, a credit from a tech level six world with a type D starport is worth .4 Imperial Credits. All interplanetary financial transactions and monetary exchanges are done on the basis of the Imperial, and thus it is not necessary to keep track of how much of your currency is obtained from one world, and so on. Upon landing, all currency desired is converted to the local currency at the table's listed rate and reconverted to Imperials upon departure.

Goods: All prices of goods on a world which are capable of being produced at the tech level of that world or lower are available at the base price given in Traveller in local currency. Goods available at a higher tech level are available at the equivalent of the base price of the item in credits of a world of the necessary tech level and with a type A starport. For example, a player wishes to purchase a map box on a tech 6 world. The base price of a map box is Cr 2500 (Traveller, Book 4, Mercenary, p 42) and it can be produced on worlds with a tech level of 9 or higher. To obtain the price of the map box on a tech 6 world, convert the base price from local currency to Imperials at its point of production. Consulting the table, a tech 9 world with a type A star-

	STARPORT TYPE					
Tech Level:	*A*	*B*	*C*	*D*	*E*	*X*
15	1.00	.95	.90	–	–	–
14	.95	.90	.85	.80	.75	–
13	.90	.85	.80	.75	.70	–
12	.85	.80	.75	.70	.65	–
11	.80	.75	.70	.65	.60	–
10	.75	.70	.65	.60	.55	.45
9	.70	.65	.60	.55	.50	.40
8	.65	.60	.55	.50	.45	.35
7	.60	.55	.50	.45	.40	.30
6	–	.50	.45	.40	.35	.20
5	–	.45	.40	.35	.30	.10
4	–	–	.30	.25	.20	bart
3	–	–	.20	.10	.05	bart
2	–	–	–	.05	bart	bart
1	–	–	–	.01	bart	bart
0	–	–	–	–	–	bart

port has an exchange rate of .7 credits per Imperial, thus making the price of the map box Cr 1750 (Imperial). The player is on a tech 6 world with a class D starport, which has an exchange rate of .40 credits per Imperial. Dividing 1750 by .40, the player discovers that the local price for the item is Cr 4375.

Services: Starport services are generally available at the local currency rate, including costs for refueling and life support servicing.

Maintenance is also available at local costs unless the maintenance is on a ship more advanced than that tech level could normally produce. For example, a player (or a group of players) in a type C cruiser lands at a class B starport on a tech 9 world with the intention of having yearly maintenance performed. The type C cruiser has type M power plants and drives, which can only be manufactured on worlds with a tech level of 12 or higher. Therefore, maintenance costs would be paid as if on a tech 12 world with a class B starport instead of a tech 9 world with a class B starport.

Trade and Speculation: When purchasing trade goods, the above notes on goods are in effect. Thus, anything capable of being produced locally and available for purchase is available at its base price in local currency. Any modification to this as a result of the purchase price die roll is done on the basis of the local price. Items which cannot be produced locally are available for the base price in the currency of a world of the correct tech level with a class A starport.

When selling goods, a different exchange rate is used. If selling goods to a world with a lower tech level, the exchange rate of the world of purchase is used. For example, consulting the resale table (Book 2) indicates that the price paid is Cr 100000. If the goods were purchased on a tech 9 world with a class B starport, (exchange rate .65 credits per Imperial) the value received would be Cr 65000 (Imperial). When selling goods to a world with a higher tech level, an exchange rate midway between the resale world and the purchase world is used. For instance, goods are purchased on a tech 6 starport C world (exchange rate .45) and resold on a tech 14 starport A world (exchange rate .95). The resale price would be in credits valued at .70 Imperial. If the resale price of the goods was Cr 100000, value received would be Cr 70000 (Imperial).

Barter: Those worlds with the notation "bart" are barter worlds, societies either so primitive or so remote that there is no meaningful basis of exchange between the economic heartlands of the Empire and them. Referees should determine the details of such a situation.

Ship Payments: Ship payments are done to the bank conducting the financing. Since this bank will presumably be on the world of manufacture, payment will be made at that exchange rate. This will mean that a ship manufactured on a world with a very high tech level will be more expensive in real terms than an identical ship manufactured on a world with a lower tech level. Referees may wish to account for this by assuming incorporation of a number of minor improvements on the ship of higher tech level design, such as greater system reliability.

Implementing the system: For small transactions, the best way to implement the system is to have travellers con-

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vert their personal spending money to local currency upon grounding ship and then pay base prices for support, lodging, bribes, items of personal equipment, etc. For large transactions, specifically trade and speculation, the easiest way to conduct the transaction is to convert the prices to their real value in Imperials. This is also the best way to carry out ship payments. Determine the monthly balance due to the bank at local prices on the world the ship was purchased on and convert this to Imperials. This gives the player a clear idea of how much money in real terms he must make a month.

Black Markets: Concern with balance of payments and trade, a wish to limit contact with off-world cultures, or a desire to protect and develop native industries may lead a strong and/or reactionary government to artificially regulate the exchange rate of its currency. Such a government will exchange Imperials for local currency at one or two exchange rate levels higher than the exchange rate table indicates. Thus, if the table indicates an exchange rate of .40, the official exchange rate may be set at .45 or .50. This is only used for exchanging Imperials for local currency. When local currency is exchanged back to Imperials, the normal exchange rate is used. The price of all goods on the world is determined using the actual exchange rate, not the artificial exchange rate.

In such a situation, a black market in currency will flourish, and can normally be contacted by players, with both Admin and Streetwise skills helping considerably. Whether or not a world sets such standards is up to the referee and should be based generally on government type and the unique situation the world is in. How vigorously the world attempts to suppress the black market is, of course, dependent upon law level.

Why Bother?: Two answers are possible. For the purist, this implements a system which reflects to a greater degree the economic differences between worlds of different tech levels and provides a sounder basis of economic interaction in the game. For the game player, it provides more diversity in the economic options available, and the more diverse the options, the more interesting the game. Besides, once the system is understood, it really isn't as much bother as it seems, unless carried to ridiculous extremes. (If your referee starts calculating the local price of the jawbreaker you're going to buy at the local candy store, he's gone too far.

Frank Chadwick

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continued from p. 7

On the first full day after the players arrive, there is an escape from the concentration camp, and the YC camp will be put on alert. At night the adult advisors and the older youths will be armed with rifles and patrol the shores of the lake. This will last for three days and nights.

If the players are spotted, they will be shot or arrested. If their ship is spotted in the air, roll 2D for 10+ to trigger a war. If spotted on the ground, it will be rapidly surrounded by units of the Collective's army. If the players fire on any city or military force, they will start a war on 2D for 5+, and will at the very least draw return fire from the Collective's military.

The money in the crates was newly printed, with consecutive serial numbers within denominations. If any of the money returns to circulation, a massive Imperial investigation will be started, which the referee must adjudicate.

Jeff May

The Bestiary

Beaked Monkey
or
Beaker
(Psittarhynchus fructophagii)

Beakers (as they are sometimes called) are common on many worlds, both in the wild and in captivity. In addition, they are found on many starships as pets. Their planet of origin is not known, but the animals can be documented as far back as far as 300 years pre-Imperial, with a range almost as widespread as at the present.

Beaked monkeys typically weigh from 2 to 3 kilograms, and measure 60 to 75 cm in length, half of which is generally taken up by the tail. Tails are sometimes bobbed on animals kept aboard spacecraft. Beakers are covered by a short fur, most commonly brown or gray. Black is rare, and white extremely so (roll 2D for 2-7 = brown, 8-10 = grey, 11 = black and 12 = white).

The skeleton and musculature follow typical terran vertebrate norms. Respiration is accomplished by the usual paired lung arrangement, the circulatory system is closed and the heart four-chambered, making the animal very similar to certain small terran mammals such as the squirrel monkey.

The animal's most notable feature, the beak, is formed of two bony projections from the palate and mandible, covered by a horny substance resembling keratin. The lower third of the esophagus is extremely heavily muscled and lined with a number of toothlike grinding structures, which break swallowed food into fragments small enough to be digested readily. In the wild, the beaker is arborial, and is thought to have originally subsisted on a diet of hard-shelled nuts and seeds, although specimens have been observed eating insects and other small animals. In captivity, beakers thrive on almost

any available type of human food.

The animals are quite popular as pets on starships because of their gregarious affection to almost all humans, their intelligence and their scrupulous cleanliness. Some individuals are rumored to act as a booster for certain psionic activities, but this last ability has not been proven to the satisfaction of most authorities.

Referee's Information: Certain animals act as boosters for psionic talents under restricted conditions. These are:

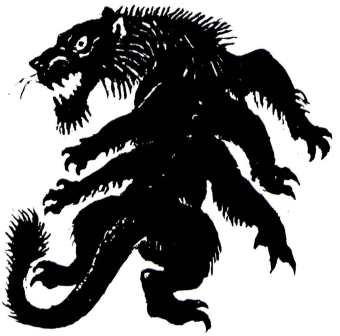
★ The animal must have the potential. (roll 2D for 10+ to determine if a particular beaker has psionic booster potential, DMs +1 if black, +2 if white). A player with psionic ability at any level greater than 0 may be able to detect a beaker with psionic enhancement potential. Roll 2D for 8+, DM of +1 for each level of psionic rating. No player can determine the amount a particular beaker will be able to boost psi potential in advance.

★ The beaker must have lived in close proximity with the human desiring the boost for at least three months.

★ The beaker and the human must be within one meter of each other during the time the boost is taking place. If this distance is exceeded, throw 2D for 4+ for the beaker to die. Roll once each combat round the separation continues.

★ The human desiring the boost must have a natural, unenhanced psi rating of 5 or higher.

If all of these conditions are met, the beaker will raise the human's psi rating temporarily by from one to six points (roll one die). Each time the player's psi strength is boosted, roll 2D for 9+ for the beaker to die from the effort. If a beaker dies during psi contact with a human, that human permanently loses 2 from his psionic strength rating. Note that this does not happen except when the beaker is used as a psi booster.



Sea Bear
(Pseudoarctos ansonii, et al)

Sea Bears are native to Thengo, a planet in the Chronor subsector, but seem to have been used in pre-imperial colonization projects in the Jewell, Lianic and Massina subsectors, and are therefore not uncommon on many planets in these regions.

Adults are typically 1 to 1.2 meters in length, and weigh from 20 to 25 kg. The skeleton is calciferous, internal, and generally resembles that of a terran vertebrate, except in the number of limbs and in the framing of the body cavity. The spinal column runs from the base of the skull dorsally along the body until it reaches the pelvis. In place of ribs, the sea bear's body cavity is supported by short lengths of bone joined in what some have described as geodesic fashion, i.e., as a series of mutually interconnected triangles. This arrangement is very sturdy, and provides an excellent protection to the internal organs of the sea bear.

Externally, the most notable feature of the sea bear is the number of limbs. Oddly enough for an animal of its size, the sea bear has four pairs of limbs, one posterier locomotory pair, one anterior pair used in defense and food acqui-

continued on p. 26

The government of Cocta is desperate for tourists (virtually its only means of getting off-planet currency) which has been on the wane since the rebellion in the outback began. They h have, therefore, taken steps to conceal the extent of the rebellion and restricted tourists to the relatively safe areas south of the capital.

Locally available transport includes hovercraft, ATV's, air/rafts, and local beasts of burden similar to terran mules, all available at .01% of the book 3 purchase price per week, including guide. (Guides are mandatory. Tourists bring their own transport must hire one guide per vehicle at a cost of CR 100 per day).

Due to the activities of the rebels, import restrictions on weapons are very tight, but Sternmetal has arranged for a quantity of weapons to be smuggled on-planet (one VRF Gauss gun and 2000 rounds for the group as a whole, and one ACR with 300 rounds of ammunition and 10 HE RAM grenades per member of the party.

The party may retain the weapons after the mission is completed, but are responsible for getting them off-planet.

Standard operating procedures for clandestine operations of this nature permit Sternmetal to describe the probable nature of the container of the report.

Referee's Information:

he referee should prepare a rough map of the terrain around the capital for several hundred kilometers in all
directions. The steamer was sunk in about 50 meters of water in a large lake (about 150 km by 300 km), located about two hundred kilometers north of the city.

For each week spent traveling to or from the lake, or spent in search of the wreck of the ship, roll 2D for 4+ for the party to be attacked by guerillas. if a 10+ is rolled, the party is taken completely by surprise. The referee should adjust the size and armament of the attacking guerillas to the size of the party.

After arrival at the lake, two die rolls should be made to determine if the hulk of the ship can be located, and the report recovered. For location of the wreck– 2D for 12+, DM +4 if using sonar or metal detection equipment, +5 if diving equipment is used for the search (these rolls are additive). This roll may be made only once per week.

For the recovery of the report– 2D for 8+, DM of -6 if no diving equipment is used. This roll may only be made once per week, after the wreck has been located.

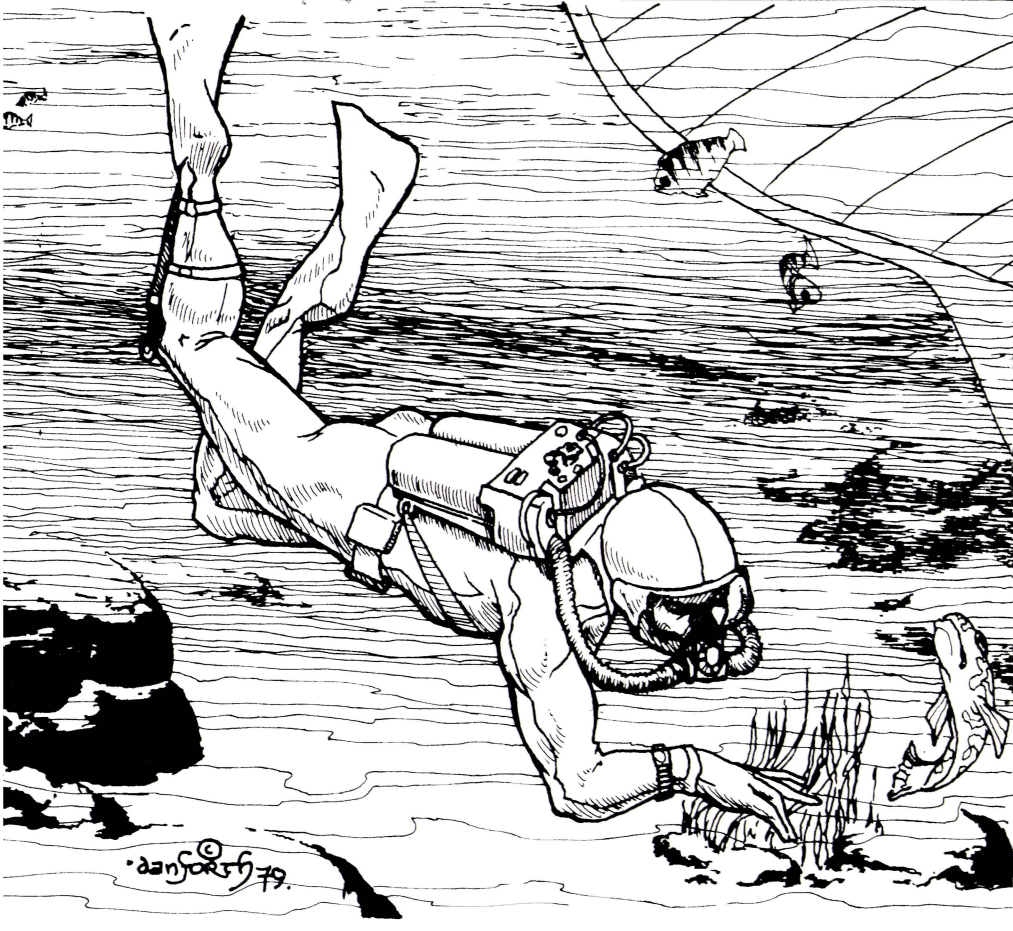
The referee should determine likelihood of arms or equipment being destroyed by guerilla attacks, and the possibility of ad hoc diving equipment being fabricated on the spot.

Note: the party will have to deal with the guide(s) in some fashion (kill them, bribe them, etc)before venturing north of the city, or the party will be intercepted and arrested by units of the local army. Guides are armed with one automatic pistol each.

If the party returns to Atarishii Okayama with the arms they will be arrested unless they have taken measures to conceal them. Some means of explaining the absence of the guide(s) (if they have been killed) will have to be devisedbefore the locals will allow the party to leave Cocta.

The weapons may be sold outside the city for 1D x 10% of their book value. Selling them will take 2D weeks, DM -2 per level of streetwise. Roll 2D for 8+ for the local police to discover the deal and arrest all involved.

Loren Wiseman



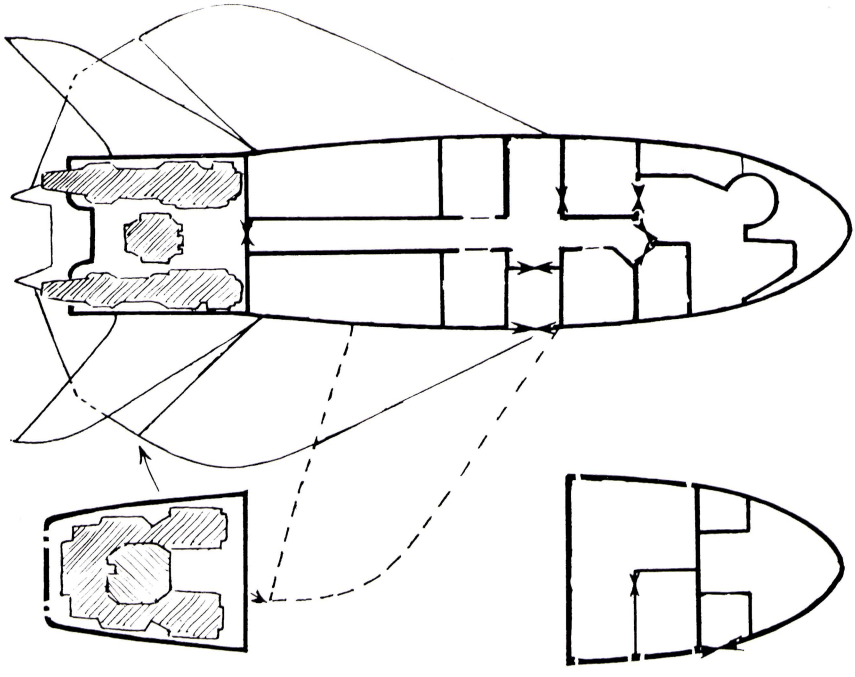
In the course of seeking gainful employment, the players are contacted by a representitive of Sternmetal Horizons, LIC.

The initial survey of the planet Cocta found it worthless for any major exploitation and thus the planet has been a backwater for many years. Recently, however, rumors have gotten out that the initial report was forged, and that extensive and valuable mineral deposits lie hidden in the region known as the Take Yabu, a dense jungle area three hundred kilometers north of Atarishii Okayama, the capital/spaceport. Sternmetal sent an undercover survey team into the region several months ago, but the report they were to send back was never received. Investigation revealed that the team had apparently completed their survey and was returning to the spaceport by a tourist excursion steamer when the ship was attacked by a band of terrorists.

The wreck of the steamer was never located, and the local government officials are reluctant to speak of it. Apparently, only a cursory investigation was made, as the area was (and still is) infested with guerillas hostile to the local government.

Amber Zone

Sternmetal Horizons, LIC, will pay CR 2000000 for the recovery of the lost survey report, or CR 100000 for the location of the wreck of the ship. They provide the following additional information:



Serpent Class Scout Ships

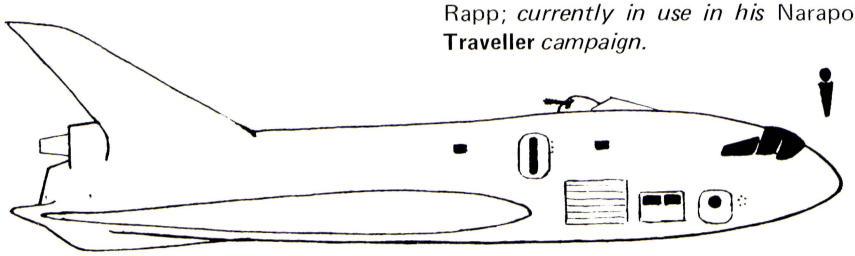
Using a type 100 (modified) hull, the Serpent Class scout ship meets all normal specifications for the Type S Scout Starship. The hull is streamlined and features variable-sweep airfoils for atmospheric maneuvering and landings.

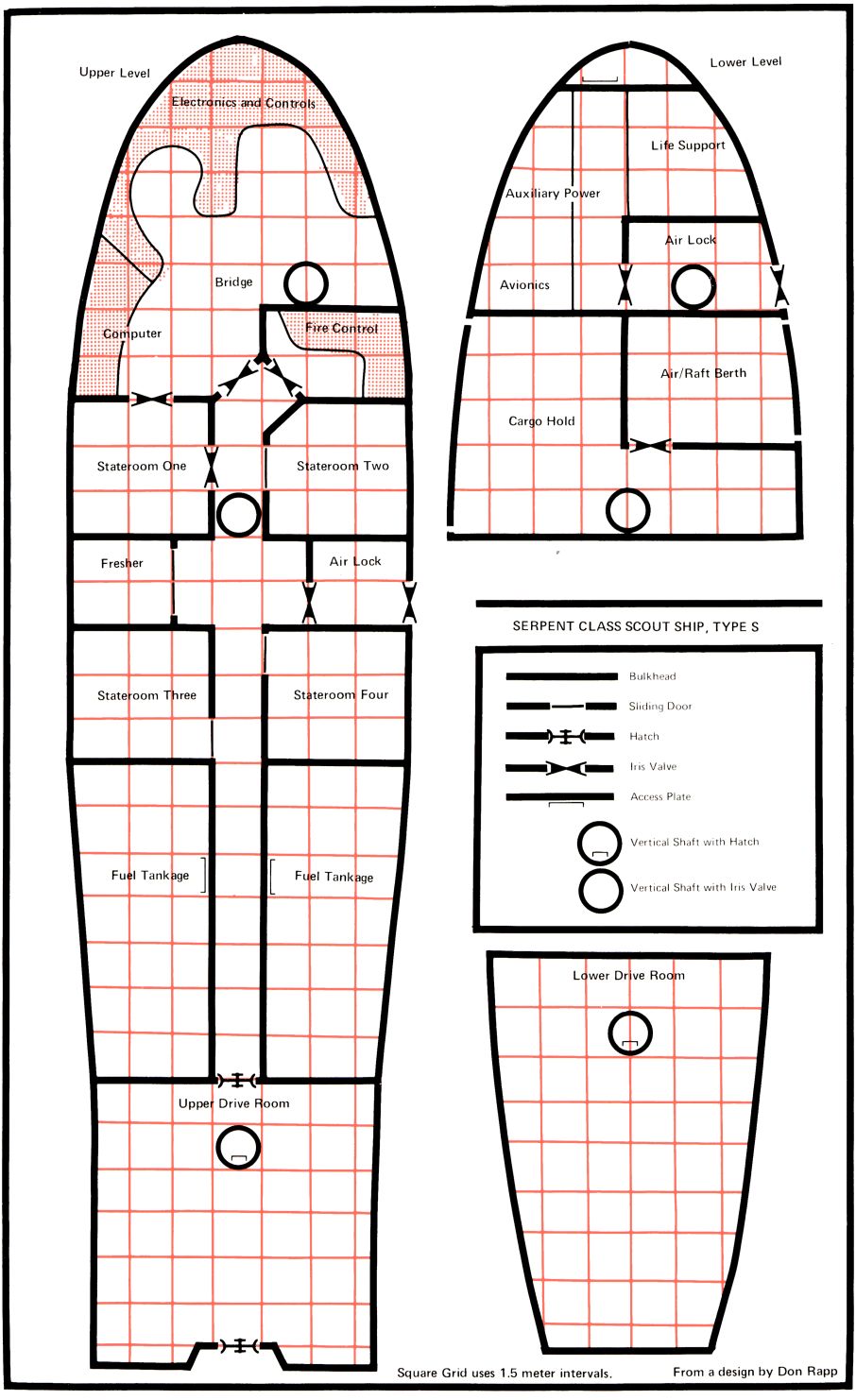
Names reported in use for the Serpent Class include Asp, Cobra, Deceiver, Eel, Python, Reptile, Snake, and Viper.

Typically placed with scouts of exemplary service, this class is capable of being highly modified. The vee tail and the variable sweep wing, coupled with hovering and VTOL capabilities, make the Serpent Class ships highly sought after.

Base price: Cr 27,630,000

—*Adapted from a design by* Donald Rapp; *currently in use in his* Narapoia **Traveller** *campaign.*




Upper Level
Electronics and Controls
Bridge
Computer
Fire Control
Stateroom One
Stateroom Two
Fresher
Air Lock
Stateroom Three
Stateroom Four
Fuel Tankage
Fuel Tankage
Upper Drive Room
Lower Level
Life Support
Auxiliary Power
Air Lock
Avionics
Air/Raft Berth
Cargo Hold
SERPENT CLASS SCOUT SHIP, TYPE S
Bulkhead
Sliding Door
Hatch
Iris Valve
Access Plate
Vertical Shaft with Hatch
Vertical Shaft with Iris Valve
Lower Drive Room
Square Grid uses 1.5 meter intervals.
From a design by Don Rapp

TDX is a specialized explosive which functions perpendicular to the force of gravity. When detonated, the major force of its explosion is directed in the horizontal plane (on a planetary surface). As a result, it is extremely efficient in its blast effects.

Examples of its use are the felling of trees, the severance of trestle, bridge, tower, or other supports, the creation of directional anti-personnel mines, and situations where a directed explosion is essential.

Consider: the use of TDX on the battlefield could cause extreme casualties on the ground, but have very little effect at even minor heights. Thus, air rafts could be used as low level bombers against low tech level forces.

THE SHIP'S -LOCKER-

Gravitationally polarized explosive appears in the Cities in Flight, or Okie, Series, including Year 2018, Earthman Come Home, and The Triumph of Time, by James Blish.

UNDERWATER ACTIVITIES

Underwater sports are popular on many planets, and about one person in six has some familiarity with the techniques and equipment used. Roll 6 (1D) exactly for each character to determine if that character is familiar with diving in general. If so, roll 6 exactly (1D) for each set of equipment listed below, except for swimming equipment, which anyone familiar with diving will know the use of.

A character familiar with diving will have a mishap on a roll of 2D for 8+, and a fatal mishap if 11+ is rolled. Roll once per 30 minutes underwater, or fraction thereof. DM's -3 for familiarity with equipment used, +2 for each ten meters total depth of dive.

Average descent/ascent speed is one meter per second. If unable to breathe (due to being caught under the surface when air supply expires, breath runs out, etc) the diver will take 2D of damage per quarter minute the lack of air persists. When unconscious, the diver will take 5D of damage per quarter minute. If unconscious, the diver will float toward the surface at a rate of .5 meter per second unless wearing weighty equipment such as oxygen tanks or otherwise prevented from floating (if caught in wreckage, for instance).

An untrained individual can hold their breath for an average of 30 seconds. A person with experience can extend this time to 90 - 120 seconds. (If a player claims a longer time, have him or her demonstrate.)

Swimming Equipment

TL 3 *Cr 200*

This equipment does not permit a character to breathe underwater, it merely permits improved vision, and faster movement. The user may dive to any depth desired, but consideration must be given to getting back to the surface again. A player with 60 seconds lung capacity could, for instance, dive to 10 meters, stay there 40 seconds, and surface within the time limit of his lungs. An inexperienced player who dives to a depth of 10 meters and spends 20 seconds there is in trouble.

Oxygen Tanks

TL 5 *Cr 150*

As described in book 3. These are not suited to use underwater unless modifications are made to the regulator. Attempting to use them unmodified will increase the chance of a mishap (DM +6). Mechanical expertise on the part of the character who performs the modifications will also effect the likelihood of a mishap. DM -2 per level of Mechanical skill, -3 if mechanical tool kit is used, +3 if no Mechanical expertise.

Compressor

TL 5 *Cr 300*

This device is used to refill air tanks in the field. A DM of +4 to the mishap roll is in effect if the tanks are filled by a person unfamiliar with diving. Note: a compressor can be jerry-rigged from a respirator by anyone with Mechanical-3 or greater and a mechanical tool kit.

Vacc Suit

TL 7 *Cr 10000*

As described in book 3. This equipment may be used underwater if modified as per the oxygen tanks described above. The same DM's apply.

Any of the above equipment can be created on an ad hoc basis by a character with high mechanical skills and the proper materials and tools. The referee should determine chances for sucess and likelihood of mishap based on his knowledge of the situation.

Computer Programming

The use of computer skill to write the extensive and complex computer programs intended for shipboard use is a long and difficult task. The skill required to write such programs is only one aspect of the problem; two other aspects are an actual understanding of the process being programmed, and the availability of time.

Computer Skill: Expertise in computer is essential to writing a program. First, it allows the individual to try. Second, higher skill levels tend to make the program smaller. Third, higher skill levels tend to allow faster completion of the program.

1. Trying: No one may attempt to write a computer program unless he has a skill level of at least 1 in computer (Individuals may always use computers for routine tasks, but that does not require programming). Exception: An individual with jack-of-all-trades may be assumed to have an equivalent level of computer skill in emergencies, but such programs as he writes will be temporary affairs, will not be retained for future use, and will not be saleable. In effect, jack-of-all-trades can be used to get out of a bad situation, but not for long-term goals.

2. Size: When a program is completed, throw one die and subtract the computer expertise being used (if the result is less than zero, make it zero). Add the result to the size for the program shown in the chart to find the size of the new program.

3. Completion: Examining the chart shows that the higher the computer skill being used, the greater the probability that a program will be completed sooner.

Understanding: Before a process can be programmed, it must be understood. The best programmer around cannot do a good program on gunnery if he does not understand gunnery. To promote understanding, the programmer must have a certain level of skill in the process being programmed, or he must have, as a permanent assistant in the programming process, someone with the required skill (in such case, the programmer must have an intelligence of 7+ and the assistant must have an intelligence of 9+). If more than 1 skill is called for, two assistants may be provided. A program cannot provide a DM greater than the lowest skill level of the skilled individuals assisting.

Time: Conceptualizing a program is reasonably easy, but actually writing and debugging it can take a long time. The individuals concerned must plan on at least two months planning and preparation time. After that period, the weekly throw for program completion is made. Note that no progressive DM is allowed as time passes; there is the possibility that the program can never be written successfully by a specific level individual for a specific program.

Partnerships and Committees: Two individuals with computer skill may work together to write a program. The higher-level individual proceeds normally. The lower level individual may add 1 to his computer expertise (for this purpose, and rolls separately, thus taking into account the assistance the other gives during the process). More than two computer experts working together are a committee. They average their expertise and may make weekly rolls equal to the membership of the committee minus 2 (to cover overhead and administration). No members of the committee may not have computer expertise. Assistants providing outside skills are not considered part of the committee.

Synopsis: To write a specific program, its optimum size, computer skill level, required throw, and additional required skills must be determined, either from the chart or by the referee. At this point, the characters assign a programmer, and any assistants to the two month preparatory period (which need not be consecutive weeks). At the end of the period, the weekly throws for completion are begun. Upon achievement of the completion throw, the size throw is made to determine the final size of the program. If it will not fit into the available computer, continue weekly throws for completion. Always throw secretly at this point for a fatal flaw in the completed program (per *Traveller* Book 1, page 17).

COMPUTER PROGRAMMING CHART

Program Name	*Size*	*Price*	*Knowledge Required to Write*	*Computer Skill*	*Throw*
Predict 1	1	2.	Navigation-1 or Gunnery-1	1	10+
Predict 2	2	4.	Navigation-2 or Gunnery-2	1	10+
Predict 3	1	6	Navigation 3 or Gunnery-3	1	10+
Predict 4	3	8	Navigation-4 or Gunnery-4	1	11+
Predict 5	2	10	Navigation-5 or Gunnery-5	2	12+
Gunner Interact	1	1	Maximum DM is Gunnery expertise used in writing the program.	2	11+
Target	1	1	Navigation-2 or Gunnery-2	2	10+
Selective-1	1	0.5	Gunnery-2	1	9+
Selective 2	2	0.8	Gunnery-3	2	9+
Multi-Target-2	1	1.	Gunnery-2	2	9+
Multi-Target-3	2	2.	Gunnery-3	2	10+
Multi-Target-4	4	3.	Gunnery-4	3	8+
Launch	1	2.	Gunnery-2	1	11+
Maneuver/Evade 1	1	1	Pilot-1 or Ship's Boat-2	1	10+
Maneuver/Evade 2	2	2	Pilot-2 or Ship's Boat-3	1	11+
Maneuver/Evade 3	3	3	Pilot-3 or Ship's Boat-4	2	10+
Maneuver/Evade 4	4	4	Pilot-4 or Ship's Boat-5	2	11+
Maneuver/Evade 5	2	5	Pilot-5 or Ship's Boat-6	3	10+
Maneuver/Evade 6	3	6	Pilot-6 or Ship's Boat-7	3	11+
Auto/Evade	1	0.5	Pilot-3 or Ship's Boat-4	2	11+
Return Fire	1	0.5	Gunnery-3	2	12+
Anti-Missile	2	1	Gunnery-3	3	10+
ECM	3	4	Electronic-3	4	9+
Maneuver	1	0.1	Pilot-1	1	9+
Jump-1	1	0.1	Pilot-1 and Navigation-1	1	10+
Jump-2	2	0.3	Pilot-2 and Navigation-2	2	11+
Jump-3	2	0.4	Pilot-2 and Navigation-2	2	12+
Jump-4	2	0.4	Pilot-2 and Navigation-2	3	11+
Jump-5	2	0.5	Pilot-2 and Navigation-3	3	12+
Jump-6	2	0.6	Pilot-2 and Navigation-4	4	11+
Library	1	0.3	not possible		
Generate	2	0.8	Pilot-2 and Navigation-4	4	12+
Anti-Hijack	1	0.1	Tactics-1 and Admin-1	1	9+

continued from p. 17

sition, and two medial pairs which can serve either purpose. The head is typical, a bony cranium to protect the brain, upon which are mounted paired sensory organs (eyes, nostrils, ears) and a ventrally located mouth. The nose is located well forward, apparantly as an adaptation for breathing while partially submerged.

Respiration and circulation are handled by the typical arrangement of paired lungs coupled with a closed circulatory system.

Sea bears are carnivores, and are usually found along seashores and in shallow off-shore areas of large bodies of water. Sea bears are solitary hunters, preying upon small aquatic and semi-aquatic animal life. The sea bear usually hunts by swimming slowly along the surface, and diving upon its prey from above, taking it by surprise.

During the mating season, sea bears will congregate in huge groups, sometimes consisting of hundreds of individuals. These groups settle for several weeks on an island or penninsula protected from dangers to the young, where male and female sea bears engage in a mating ritual not fully documented. Each pair eventually produces one to three young. As soon as the young are able to travel,(usually after six to eight weeks), the group breaks up into family units, which care for the young until they are able to fend for themselves (usually after six months). The family units then break up until the next mating season. Some observers have reported scattered instances of sea bears mating for life, and hunting as a team.

Loren K. Wiseman

The government factor in the Universal planetary profile need not be a number 0-9 or a letter A-F. For example, M could be used to indicate a military government, perhaps a junta or coup.

Mining the Asteroids

The mineral resources of the universe are perhaps most available in the asteroid belts scattered throughout known space. As the shattered remnants of worlds, they lay open the inner cores which are so inaccessible on ordinary planets. Mining these belts however, depends on locating specific chunks of valuable ore and then keeping tabs on them while reports are made, mining crews gathered, and finally exploitation begun. This entire procedure takes experience and lots of money. But the prospecting, the very first step in the process, can be performed by almost anyone. And the big mining companies encourage independent prospecting, because it minimizes their own risk, and helps keep the overhead down.

Prospecting involves actively moving through an asteroid belt, locating likely looking chunks, investigating them, and (if one looks promising) staking a claim. Generally, that claim is then sold to a mining company which exploits it, either by establishing a mine, or by moving the chunk physically to a world or to an orbital factory. Sounds simple, doesn't it. Well, it isn't.

Asteroids come in three general types— *frozen gas, rocky chunks,* and *metal chunks.*

Frozen gas asteroids consist of organic materials (carbon-based) and water. They are useful to colonies, especially orbital or Lagrange point settlements, but they are easy to find, and of generally low value. Prospecting them gives a very low return.

Rocky chunks have almost nothing to recommend them. Formed of common elements, they are ubiquitous, and each seems to be the same as the next. Companies rarely need them, and they don't even serve well as large starship hulls (they're too fragile).

That leaves metal chunks. They are also very common, and that very availability makes them practically worthless. They do serve as good starship hulls, and metal mining companies constantly use nickel-iron asteroids as a source of metal. But such asteroids are free for the taking, and no one will pay for a claim on one when they could go out and easily stake a claim themselves.

If you look closely, you'll see there is nothing left to prospect. And that's where prospecting comes in— prospectors go back over metal chunks, and even rocky chunks, looking for things that are hard to find, or that have been missed in earlier examinations; such things as rare metals, rare elements, unusual configurations, and even artifacts. This sort of prospecting is difficult, often unrewarding, and chancy. Prospectors find little to help them in their search; rarely can the external appearance of a chunk or a normal sensor scan reveal enough to show the presence of value. Prospectors must go out onto the chunk, take samples, look long and hard, and generally spend a lot of time just looking.

PROSPECTING

The procedure detailed on the following pages covers the process of prospecting in an asteroid belt. It consists of two parts: getting started, and actually prospecting. Page 16 covers the process of getting a license to prospect. Page 17 covers the process of looking for valuable materials.

Each box in the flowchart contains a brief description of the current situation, indications of applicable skills, and suggested throws for each of the available next steps. Each box represents one week of time spent in the process.

Pages 18 through 23 cover the specific rules covering the procedure.

8+

APPLY FOR LICENSE *(Admin, Leader)*

7–

6–9 10+

OFFER BRIBE *(Bribery)*

5–

LICENSE GRANTED FOR ASTEROID MINING

3– 4–6

APPLICATION DENIED *(Prospecting)* 7

10+ 8–9

8+ 6–7

CONSIDER BRIBE

5– *(Bribery)*

9+

MAKE SPECIAL APPLICATION *(Administration)*

8–

4– 5–8

SEEK PATRON *(Liaison, Carousing)*

9+

10+

PATRON ASSISTS IN VENTURE *(Leader)*

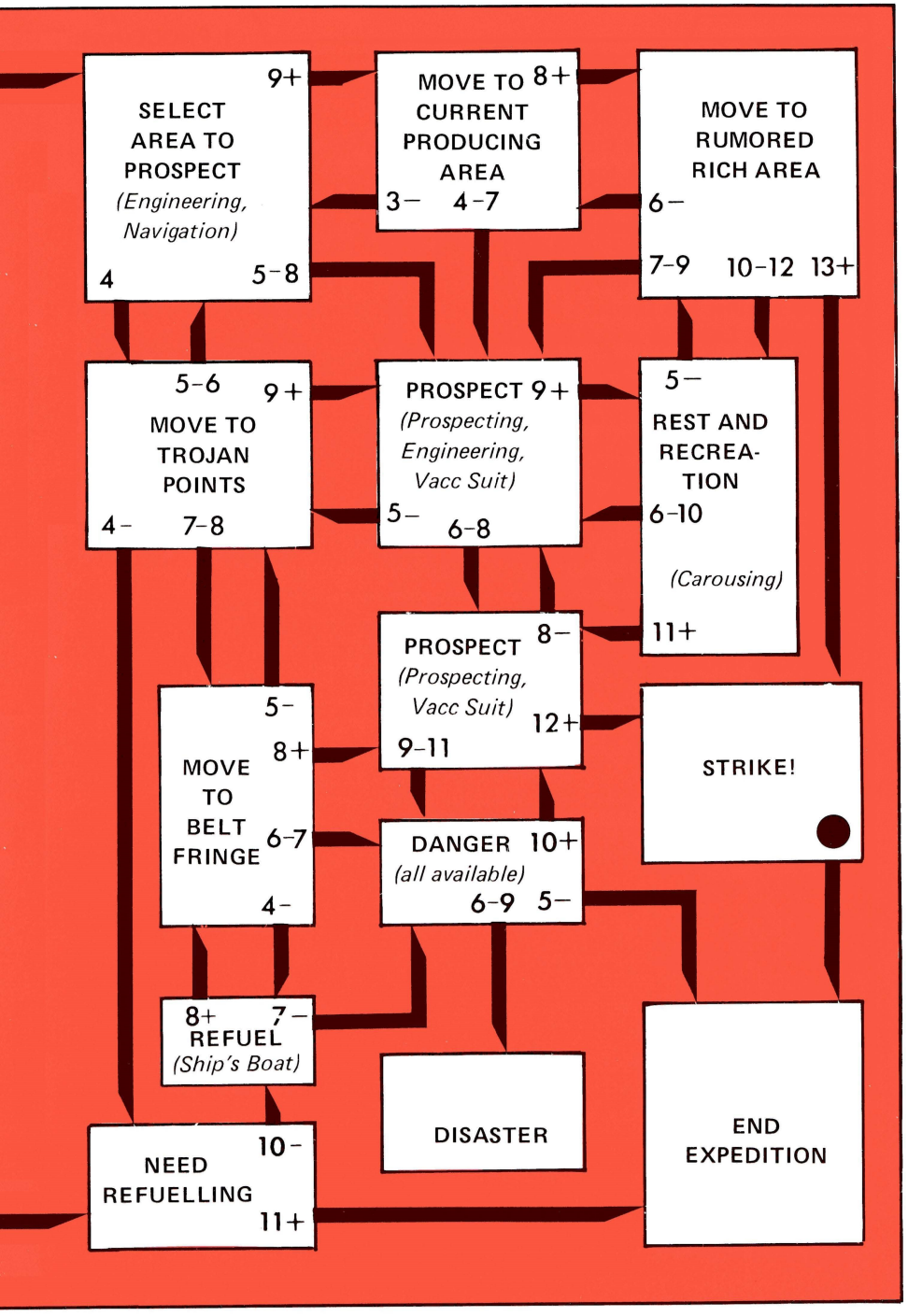
9–

5–

DECIDE TO PROSPECT WITHOUT A LICENSE *(Prospecting)*

6+

DECIDE TO PROSPECT IN BELT FRINGE


SELECT AREA TO PROSPECT (Engineering, Navigation)
9+
4
5-8
MOVE TO CURRENT PRODUCING AREA
8+
3-
4-7
MOVE TO RUMORED RICH AREA
6-
7-9
10-12
13+
5-6
9+
MOVE TO TROJAN POINTS
4-
7-8
PROSPECT 9+
(Prospecting, Engineering, Vacc Suit)
5-
6-8
5-
REST AND RECREA-TION
6-10
(Carousing)
11+
PROSPECT 8-
(Prospecting, Vacc Suit)
9-11
12+
5-
8+
MOVE TO BELT FRINGE
6-7
4-
DANGER 10+
(all available)
6-9
5-
STRIKE!
8+
7-
REFUEL
(Ship's Boat)
DISASTER
END EXPEDITION
10-
NEED REFUELLING
11+

1. PROCEDURE

The flowchart on pages 16 and 17 details a process for prospecting in an asteroid belt by Traveller adventurers. Each block on the flowchart contains a description of the action, indications as to applicable skills, and suggested die rolls for each possible succeeding action. The referee may apply the throws as indicated, or may ask for input from the players as to what they desire to do. Applicable skills should be used as DMs (DM equal to the skill level available); if more than one character has the same skill, only the highest skill level should be used, but all available skills should be considered. For example, if Admin and Leader are noted as applicable skills, and one player has Leader-3 while another has Leader-1 and Admin-1, then the DM allowed should be +4 (counting Leader-3 and Admin-1). Skill DMs are always plus. If desired, a band of adventurers may always elect to take a DM of -4 in lieu of all other DMs (this may sometimes provide an advantage).

In all cases, the referee may move characters through the flowchart without regard to the flowchart if that would provide a more realistic procedure.

Each block represents the passage of one week's time, and the consequent expenditure of one week's provisions and one week's fuel.

When beginning, the expedition must be outfitted with a ship and sufficient provisions for the duration (see card no. 2). After such preparation, the referee should consult the first block on the flowchart, labelled "Apply for License." The application should cost from Cr1,000 to Cr6,000, probably without a refund if the license is not granted.

After the license application, the situation should flow through various blocks as determined by die rolls and skill DMs.

2. FITTING OUT

The decision to set out on a prospecting expedition must be based on a basic capability, which depends on the group having a ship, and enough capital to supply food, air, and fuel for a period of time.

The Ship: Any type of ship may be used for prospecting, including a yacht, a research ship, even a military ship. In general, it must have stateroom space for the prospecting crew, a maneuver drive capable of 1G, and enough storage space for food and other supplies for the duration of the prospecting period.

Supplies: In general, each person in the expedition requires 1 kilogram of canned or packaged food and other essentials per day, costing an average of Cr25 per kilogram. One ton of such supplies in the cargo area will support 2000 person/days at a cost of Cr50,000. That translates to 285 person/weeks at a cost of Cr175 per week.

Overhead: When outfitting, the crew should probably invest in a safety inspection to uncover any basic problems (Cr500), and in any repairs called for by that inspection. A complete recharge of the ship's oxygen system (Cr1000), and water system (Cr500) is also a good step.

3. BRIBERY

When a license is not issued, some individuals may decide to offer a bribe to the clerk at the license office in hopes of getting it issued. Such a bribe will usually be Cr1,000, with each additional Cr1,000 gaining a DM of +1 on the die roll for success on the bribe.

Note that the flowchart provides two blocks concerned with bribery: one where a week is spent considering the bribe, sizing up the situation, and generally getting ready, and then one where the bribe is actually made. Results include a rebuff, a license granted, or a reapplication allowed.

4. SPECIAL APPLICATION

A denied application may be appealed to a higher level in the local bureaucracy, especially if the characters feel that their original application was unjustly denied, or if a patron intercedes on their behalf.

Special applications will cost from Cr1,000 to Cr6,000, and basically constitute a re-application for a license to prospect.

5. PATRONS

Prospective prospectors may be well-served to find a patron who will help in the process of obtaining a license. Such individuals often make their living performing such services; they take a percentage of the final profit in return for managing the license application.

The patron percentage averages 10% (and may range from 7% to 12%). Further costs for the license are born by the patron (who probably knows how to obtain them cheaper as well). If a bribe is called for, the patron will spend Cr2,000 for the bribe, gaining a DM of +1.

It is possible that a license is unobtainable, in which case, the patron will so state, although he will remain in the deal for his percentage.

It is also possible that the application process, even with a patron, will again arrive at the seek patron box. In such a case, no new patron is found, but the characters may cut the patron out of the deal and proceed to the "Decide to Prospect Without a License" box. The referee may decide whether the parting is amicable or not.

6. UNLICENSED PROSPECTING

Until prospectors are established and well-known, there is the chance that their license will be checked. Thus, the safest method of unlicensed prospecting is in the very fringe of the belt. The fringe is a more dangerous area, while at the same time, it has a marginally greater potential.

Any group beginning a prospecting expedition without a license finds that it must begin in the fringe.

7. PROSPECTING AREAS

There are four areas from which prospecting may begin. They all border on each other, and often a group will begin in one area, start prospecting, and end up in another area. These four areas are:

The Current Producing Area: This area (situated within the main body of the belt) is where most prospectors are currently operating. With some work, there is a reasonable chance that a strike can eventually be achieved.

The Trojan Points: This area is beyond the main body of the belt, situated at the Lagrangian points of the system's gas giant (or solid giant, if no gas giant is present). It too has an average potential of an eventual strike.

The Rumored Rich Area: Contact with other prospectors will eventually produce rumors as to the rich areas in the belt. This area is one such area. It has the greatest potential of an immediate strike, but only to experienced prospectors. Any expedition with at least prospecting-1 is allowed a DM of +1 on the suggested throw; the DM should be +1 regardless of the actual level of prospecting skill present.

The Belt Fringe: This area is the most dangerous, but it also has the most potential, after the rumored rich area. The fringe is the area entered by unlicensed prospectors, after which they tend to move into the other areas of the belt.

All beginning areas lead to boxes labelled 'Prospect,'' as well as to other beginning areas. Prospect boxes are the key to making a strike, and the key to gaining prospecting skill. Of the two prospect boxes, the second is adjacent to the strike box; it is also the more dangerous, as it is adjacent to the danger box (see card no. 9).

For the first 26 weeks spent in prospect boxes, each member of the expedition receives prospecting-1. For each additional 39 weeks spent in prospect boxes, each member receives his or her choice of an increase of 1 in prospecting or in vacc suit.

8. REFUELLING

Any ship can be assumed to be fully fuelled (more or less) when the expedition begins. That fuel will last up to 39 weeks (for maneuver drive use in system, as well as life support and overhead).

Characters in an expedition are, of course, responsible for bookkeeping and making sure that their fuel level remains adequate. When necessary, they should move toward the refuelling box and refill their tanks.

Refuelling at the "Refuel" box indicates the refilling of the ship's tanks at the local gas giant, and will allow 39 more weeks of maneuver. If the system has no gas giant, then refuelling may require the purchase of fuel at a starport, or selection of a frozen gas asteroid.

At times, however, the procedure will move the ship to the "Refuelling" box (or to the "Needs Refuelling" box) as an indication that unusual maneuvers have drained the tanks, or that someone was not paying attention to fuel conservation procedures.

9. DANGER

Expeditions in the belt fringe, in the process of refuelling, or in the second prospecting box, may find themselves forced to the "Danger" box. This situation indicates the immediate possibility of disaster (covered fully in card no. 10).

DMs available when in the danger box are listed to the right. The highest level of each skill may be counted, but each skill type may only be considered once. In lieu of the skill DMs, the voluntary DM of -4 may be chosen instead, although this may well force an end to the expedition.

Engineering
Navigation
Prospecting
Ship's Boat
Vacc Suit

10. DISASTER

When disaster strikes, the expedition is subjected to an irreparable situation, and (if the individuals survive) it must call for assistance.

Personal Survival: Each individual must throw for personal survival. The suggested throw is constitution, modified by DMs for prospecting, vacc suit, and any other deep space skills which seem applicable. If the throw is failed, the individual has died.

Expedition Rescue: The expedition itself must call for help, and will be rescued by elements of the local government rescue operation. However, a lien will be placed on the ship (for from 7% to 12% of the ship's current value) until rescue costs are paid.

Unlicensed Prospecting: If the expedition is found to be prospecting without a license, the ship and all supplies aboard will be confiscated.

11. STRIKE!

If a strike is made, then the expedition will have encountered some form of valuable material, and may immediately proceed to end the expedition and convert it to cash. Four strike types are listed below, with suggested throws indicated to determine the specific type included in the description:

Rare Metals (throw 2-6): Including gold, silver, titanium, cobalt, platinum, or iridium.

Special Materials (throw 7-9): Including gemstones, rare earths, radioactives, and even fossils of interest to the scientific community.

Artifacts (throw 10): An asteroid has been found with artifacts from an alien civilization. The referee determines the nature of such materials, and their value. Characters may elect to retain the artifacts, or to sell them.

Salvage (throw 11-12): With danger everpresent in the belt, many ships are lost in the belt; finding one makes salvage operations possible. This result indicates that one such ship has been found; the characters may rehabilitate the ship and turn it to their own purposes, or they may return it to the starport and sell it for salvage (getting perhaps 50% to 75% of its sale price, the remainder going for court and bureaucratic expenses).

12. SELLING OFF STRIKES

Upon ending an expedition, a strike may be sold to the highest bidder. In the case of rare metals or special materials, mining companies will bid on a decaying basis, as explained below. Artifacts and salvage must be administered by the referee.

Decaying Bids: When a strike is made, the ship's computer retains sensor tapes of the materials or metals, and of the asteroid's orbital data. This information, in tape form, is what is presented to the mining company. The expedition members may go to some or all of the three mining companies in the belt, and ask for bids. Because they are jealous rivals, each will bid, but will reduce the offer for each additional bid that the expedition seeks.

A mining company bid is made by rolling two dice, preferably of two colors, such as red and white. The white die is the exponent of 10, while the red die is the multiplier of that figure. Thus, a white die oll of 1 indicates 10, while a white die roll of 6 indicates 1,000,000. A red die roll of 1 means that the white die roll is multiplied by 1, while a red die roll of 6 indicates that the white die roll is multiplied by 6. Possible bids range from Cr10 to Cr6,000,000.

A bid is reduced on the exponent die (for example, a bid of 6,000,000 would reduce to 600,000) if a mining company reduces its bid because other bids are sought. The exponent is reduced by one for each additional bid sought.

Mining Companies are honest, or they would have trouble staying in business. Payment on a claim sold to them is made by a post-dated note payable in two weeks. In that time, they verify the claim to be as specified; if not, the note is stopped at the bank before it becomes due.

Unlicensed Prospecting: Mining companies will automatically reduce any bid on a claim by 1 on the exponent die if it is offered by an unlicensed expedition.

Artifacts: Artifacts may be sold off using the same procedure as mining company bids. In this case, however, the bids are made by local, subsector, and imperial agents. The referee should monitor these bids to insure that they are in line with the true value of the artifacts which have been discovered. It may prove prudent for bids to be lowered if the artifacts are investigated to the point of damage prior to offering them for sale.

13. END EXPEDITION

Arrival at this box marks the end of the current prospecting expedition. To continue prospecting, the expedition must re-outfit, and must obtain a new license, beginning a new cycle through the procedure.

PERSONAL DATA AND HISTORY

1. Date of Preparation

2. Name

3. UPP

Stren Dext Endur Intel Educ Soc

4. Noble Title

5. Military Rank

6. Birthdate

7. Age Modifiers *(+ for drugs; - for sleep)*

8. Birthworld

SERVICE HISTORY

Personal service data produced from the appropriate character generation system.

9. Service

10. Branch

11. Dischargeworld

12. Terms Served

13. Final Rank

14a. Retired? ☐ Yes ☐ No

14b. Retirement Pay

15. Special Assignments

16. Awards and Decorations *(include Combat Command Credits, Commendations, Medals, etc)*

17. Equipment Qualified On

18a. Primary Skill

18b. Secondary Skill

18c. Additional Skills

19a. Preferred Weapon

19b. Preferred Pistol

19c. Preferred Blade

20. Travellers' Member? ☐ Yes ☐ No

PSIONICS

Warning: Information regarding an individual's psionic ability is confidential, and may not be released without his or her consent.

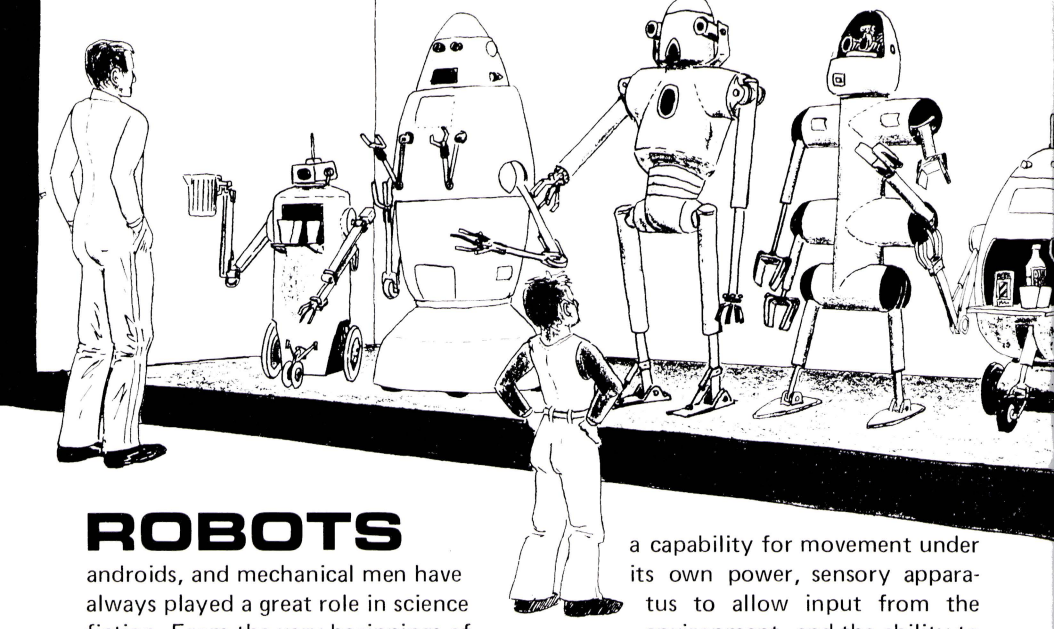
21. Date of Test

22. PSR

23a. Trained? ☐ Yes ☐ No

23b. Date Completed

24. Talents and Current Levels



ROBOTS

androids, and mechanical men have always played a great role in science fiction. From the very beginnings of history, people have viewed mechanical, non-human intelligence with a mixture of fear and fascination. From Capek's *R.U.R.* through Asimov's robots and Saberhagen's berserkers (as well as countless others) to the droids of *Star Wars* and Ash of *Alien,* robots have been an integral part of SF literature.

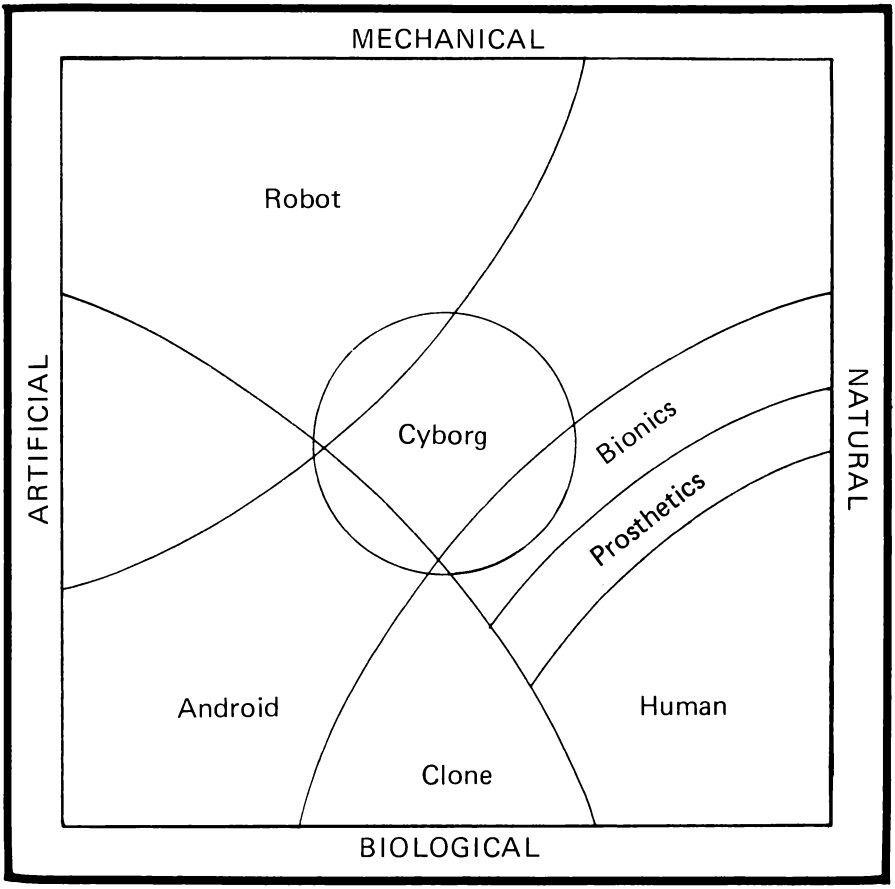
Before addressing the general idea of robots, it is necessary to define exactly what we are talking about. Is a robot a highly-polished, anthropomorphic English butler type like C3-PO, or is it a squat, utilitarian R2 unit? Does a computer-controlled tank qualify as a robot, and what about a smart bomb? What about an assembly-line welding machine? How do you classify an artificial person (perhaps the Frankenstein monster is the best example)? For the purposes of these ref's notes, we consider the requirements for a being, artificial or natural, to be a self-contained machine (in the broadest sense) endowed with artificial intelligence. Subordinate assumptions include a capability for movement under its own power, sensory apparatus to allow input from the environment, and the ability to interpret and act upon information. These assumptions are not necessarily inviolable; some circumstances may arise which call for exceptions.

ref's notes

THE CLASSIFICATION OF BEINGS

The concept of artificial beings dictates a classification system which is based on the natural beings being emulated. This is possible within a two dimensional context, ranging from the natural to the artificial and from the biological to the mechanical. For example, human beings are both natural and biological while the traditional concept of robot is mechanical and artificial.

Figure 1 shows this two-dimensional context, with the ranges for most types of the beings shown. It is important to remember that rarely will a category occupy only a point on the table; many humans are completely natural, but the addition of fillings in teeth, eyeglasses, replacement joints, or artificial nails prompts some shading into the artificial range. Similarly ...nical replacement of organs with



cloned organs dictates shading from the purely natural toward the artificial.

DEFINITIONS

The following definitions of various beings should provide a framework within which future ref's notes on this subject will build.

Being: A self-aware, self-powered individual with the capacity to sense its environment and react to it. Humans, intelligent aliens, robots, and androids are all beings.

Robot: A mechanically-based artifact manufactured to some set of specifications. A robot may or may not be anthropomorphic. Examples of robots include Robbie from Forbidden Planet and C3-P0 from Star Wars.

Android: A biologically-based being created to a set of specifications for some purpose or duty. Androids exhibit life, in that they are biologically living; their distinction is that they were created, rather than having evolved. Androids generally are incapable of reproduction, and can be identified by close inspection. Some suggestions concerning androids in science fiction include permanent identifying marks such as tattoos or a dyed skin. Ash, from Alien, may be an android.

Clone: A biological copy of an existing being. A clone is a duplicate repro-

duced through the use of technology; alterations in the being's attributes or qualities generally do not occur. The relicts from Jack Vance's novel, *To Live Forever,* are clones used to produce a form of immortality for certain individuals.

Prosthetics: Replacement parts of biological beings. Prosthetics are intended to duplicate ordinary capacity for individuals who have lost organs or limbs through accident or disease.

Bionics: Enhanced replacement parts for biological beings. Unlike prosthetics, bionics provide a function better than the original organ or limb.

Cyborg: A biological individual who has been replaced in great part by mechanical components, usually (although not always) for purposes for which natural attributes will not function. A cyborg may be equipped with a very tough artificial skin, special vision lenses and provision for special energy sources, thus making possible activity in vacuum or under great pressure.

Having laid a groundwork for discussion, we will now examine the construction and purchase of non-player-character robots, and outline some rules for their use in a Traveller campaign.

Specific details of the economic aspects of robots for a particular campaign must be determined by the referee to suit his or her own situation, but here are some suggestions. The minimum tech level at which a robot may be manufactured is 12, and therefore, robots may not be manufactured on planets with tech levels lower than that. As with all items, however, robots may be imported to planets where they cannot be manufactured. The increase in price would depend on individual circumstances. Also, it is possible that used or damaged robots might be available at reduced prices, and "hot" or stolen robots might also be available.

Armed robots and warbots (military models) will naturally be subject to legal restrictions on most planets. The referee should use the law level of a particular planet as a guide here. Additionally, planets might have other restrictions on the use of robots. A planet might restrict importation out of a desire to protect local jobs, out of anti-mechanical paranoia, or for some obscure sociological or religious reason.

CONSTRUCTION

If a player does not wish to purchase a standard model, and if he or she has access to a manufacturer or manufacturer's representative, a robot may be custom built to a player's specifications. The procedure is similar to that for building a starship (see book 2). The player(s) decide what is needed, then run through the construction checklist (given below). This checklist is then presented to the manufacturer, who will produce a robot. The factory will require a down payment of 30%, with the balance payable on delivery. The actual price of the robot is determined by the sum of the cost of its components. Standard models and models which are produced in lots of 100 or more are granted a 25% discount off purchase price due to economies of scale. Other discounts may be available depending on individual circumstances.

BASIC COMPONENTS

A robot requires a brain, a power plant, a frame or chassis to which the other components are attached and which provides some protection to the delicate workings of the robot, a basic sensor package, and some means of

moving from one place to another.

Brain: The brain is the most important component of a robot, and the most difficult to manufacture. A complex sponge-matrix of semi-conducting pseudo-neural pathways, the brain is the center of the robot's "intelligence". There are several models of brain, each progressively more complex and more compact, and each available at a different tech level. The mass, tech level of availability, cost, and power requirements of the types of brains are listed in the appropriate section of the brain table. Brains are very sensitive to shock, extremes of temperature, and excessive radiation. Certain robots come in two or more sections, in order to protect the brain from damage. These robots have a "master" section, which contains the brain and a power plant, and one or more "slave" sections, run from the "master" by remote control.

Chassis: This is the framework to which all other components are attached. In addition, the chassis provides an outer covering which provides protection from outside contaminants such as dust, and from prolonged exposure to hard vacuum conditions, but not from corrosive or insidious atmospheres. The chassis can be constructed to generally resemble a human being (two arms, two legs, torso and head) or can be made almost indistinguishable from a human, at great loss of flexibility and increased cost. This is covered later, in the section called *anthropomorphism.* The chassis section of the components table lists the characteristics of the various types of chassis.

Basic Sensor Package: This includes auditory, visual, and olfactory sensors capable of performance comparable to the human senses. This package is required as a base for all other sensory apparatus.

Power Plant: This is a hydrogen/oxygen fuel-cell capable of thirty days continous operation before refueling is needed. Other types of power plant may be devised at the referee's option. The power requirements of a particular robot may be determined by totalling the power requirements of the robot's components as listed on the components table. A robot may not use components in excess of the rating of its power plant.

Locomotion: Every robot, with rare exception, must be able to get from place to place under its own power. there are four basic types of locomotory apparatus in common use. These are wheels, which take up the least space, and are the most inexpensive, but have limited ability to traverse rough terrain; legs, which are very space consuming, but provide excellent rough terrain capability; tracks, a compromise between expense, speed, and rough terrain capability; and anti-gravity units, which are compact and enable the robot to cross any terrain with ease, but are extremely expensive. The mass, cost, and power requirements of each type of locomotory apparatus for each type of chassis are given on the components table.

ADDITIONAL COMPONENTS

Players will, of course, wish to add additional components to tailor their robot to a specific function. What these components are and what they do are described briefly below.

Arms—

These are sensor or tool equipped extendable limbs, any number of which, (within the mass limits) may be installed on a robot. No arm may carry components with a total mass greater than its rated capacity without damaging itself. The characteristics of all three arms are listed on the components table. There are three types. *continued on p 42*

COMPONENTS TABLE: Part II

Chassis:

Type:	Total Unit Mass (kg):	Chassis Mass (kg):	Cost (100 Cr)
I	50	5	75
II	75	8	95
III	100	10	10
IV	200	20	20
V	400	40	30
VI	1000	100	40
VII	2000	200	50

Power Plants:

Type:	Power Output:	Mass (kg):	Cost (1000 Cr):
A	10	20	.6
B	20	30	.8
C	30	70	1
D	40	150	1.2
E	50	300	1.4
F	70	400	1.5
G	90	500	2

Mass includes fuel for 30 days operation.

Locomotory Apparatus:

Wheels

Chassis Type:	Mass (kg):	Power Requirement:	Cost (1000 Cr):
I	7.5	4	.4
II	12	7	.5
III	15	9	.5
IV	30	16	.6
V	60	30	.7
VI	150	75	.8
VII	300	140	1

Tracks

I	10	5	.5
II	15	8	.6
III	20	10	.8
IV	40	20	1
V	80	40	1.2
VI	200	80	1.4
VII	400	150	1.6

COMPONENTS TABLE: Part I

ITEM:	MASS (kg) (ammo not incl.):	POWER REQUIREMENTS:	COST (1000 Cr):
Armaments:			
Body/Snub Pistol, modified	1	1	.7
Auto-Pistol, modified	2	1	.7
SMG, modified	5	1	.8
Auto-Rifle, modified	5	2	1.5
Laser Carbine, modified	8	5	3
PGMP-12, modified	10*	10	11
PGMP-13, modified	18*	10	70
PGMP-14, modified	27*	15	325
FGMP-14, modified	12*	10	125
FGMP-15, modifed	30*	15	450
LAG, modified	4	3	820
Lt MG, modified	60	2	1.4
Auto Grenade Launcher, modified	7	2	1
RAM Grenade Launcher, modified	7	2	1
**These weapons may only be installed on chassis types VI and VII.*			
Sensors:			
Basic Sensor Package	2	1	.2
Enhanced Night Vision	1	1	.2
Passive IR	1	1	.2
Active IR	2	2	.3
Passive Ultra-Violet	1	1	.2
Active Ultra-Violet	2	2	.3
Subsonic Audio	1	1	.2
Ultrasonic Audio	1	1	.2
Telescopic Visual	2	1	.2
Low level Audio	1	1	.2
Communications:			
Standard Freq Radio	1	1	.1
Multi-Freg Radio	1	1	.2
Counter ECM package	2	2	.3
Televisual Camera	3	4	.2
Voder/Vocorder	1	2	.2
Remote "Master" unit	2	3	.4
Remote "Slave" unit	2	2	.2
Work Arms:			
Light	10	2	.5
Medium	20	5	.7
Heavy	50	10	1
Work arms may support up to two times their mass in installed components.			

COMPONENTS TABLE: Part III

Locomotory Apparatus (cont.):

Chassis Type:	Mass (kg):	Power Requirement:	Cost (1000 Cr):
	Legs		
I	15	8	.6
II	23	12	.8
III	30	20	1
IV	60	28	1.2
V	120	60	1.4
VI	300	90	1.6
VII	600	200	2
	Anti-Gravity Units		
I	6	10	1
II	10	15	1.5
III	12	25	1.75
IV	25	35	2
V	50	75	2.2
VI	120	100	2.4
VII	250	250	2.5

Brains:

Tech Level:	Programming Capacity:	Mass (kg):	Cost (1000 Cr):
12	2	8	100
14	3	6	500
15	5	4	1000
16	7	3	2000

Light Arm: The light arm is approximately one meter in length, and is usually equipped with a manipulatory device duplicating the human hand. This eliminates the need for a "swiss army knife" contraption on the end of the arm and permits the robot to use tools shaped for human hands.

Medium Arm: The medium arm may carry a "hand" similar to the one used above, or may be fitted with one of the other components listed below.

Heavy Arm: The heavy arm has the same general characteristics as the light and medium arm, but has a greater capacity.

Sensors—

Enhanced Night Vision: This apparatus permits the robot to see in all lighting conditions but the complete absence of light.

Passive IR: This unit permits the robot to see by detecting naturally present IR radiation. It does not project infrared.

Active IR: This unit acts as does the passive unit, but emits IR radiation, like a searchlight. This unit has a greater range, but can be detected by other IR sensors very easily.

Active and Passive UV: These units act as the IR units mentioned above but

using ultraviolet rather than infrared radiation.

Subsonic Audio: This unit detects sounds too low in frequency for the human ear.

Ultrasonic Audio: This unit detects sounds too high in frequency for the human ear.

Telescopic Visual: This unit enhances the robot's vision in the visual spectrum, acting as binoculars.

Low Level Audio: This unit detects sounds too faint in volume for the unaided human ear.

Communications—

Standard Frequency Radio: A single channel radio unit, for inter-robot and robot/human communication.

Multi-frequency Radio: A multi-channel radio for inter-robot and robot/human communication.

Counter ECM: Equipment to counteract jamming of radio communications.

Televisual Camera: A unit for the transmission of information from the robot's visual sensors to a reception unit elsewhere.

Voder/Vocorder: A device for the conversion of speech to electronic impulses which a robot can understand and vice-versa. This permits robots and humans to converse.

Remote Control Unit: This equipment comes in two parts, the "master" unit and the "slave" unit. This equipment permits a robot engaged in a hazardous occupation (fire-fighting or military activities) to do so at a reduced risk to the robot's brain. This arrangement requires at least two chassis and two or more power plants.

Armament—

The weapons listed in the components table represent versions specially modified for use in robots. The weapons include provision for increased ammunition supply, ventilation and cooling where required and links to sensors for aiming and firing the weapon. If a robot is equipped with the proper manipulative appendages, it may reload itself also. Normal visual sensors are adequate for aiming and firing, but enhancement may be desirable in some conditions.

Next, we will outline some rules for using robots in a Traveller campaign. Please bear in mind that these are only suggestions, and are not meant to be exhaustive. Individual referees should feel free to modify or add to these rules as they see fit.

GENERAL NOTES

Robots should be treated as non-player-characters by the referee. While they are intelligent and capable of some independent action, they are limited by their programming in the actions they may take. Referees might find it convenient to consider them to be about the same mental caliber as an anthropoid ape (chimpanzees, gorillas, etc.).

Robots are used by some societies in jobs that are considered too dangerous, too demeaning, or too tedious for human beings. In addition, although they are initially somewhat expensive, robots are usually cheaper than humans in the long run. A starship captain, wishing to save on crew salaries and staterooms, might purchase a robot to act as a steward or even as a pilot or navigator. A military base on a planet far removed from the trade lanes and not likely to be attacked for years (but vital nonetheless) might be manned by robots. An outpost on a planet with an environment in which humans could not operate efficiently might be staffed by robots. Other jobs that robots might fill include fire fighting, mining, exploration and surveying, maintenance, and service (valet, butler, etc.).

PROGRAMMING

The various actions a robot performs are controlled by the instructions which it is given. These instructions are called programs, and the process of instructing a robot in a given task is called programming.

A program tells the robot all it needs to know to perform a single job. Since some jobs are more complex than others, some programs are longer than others. The total number of programs a robot can "know" at any one time is governed by the capacity of its brain. Each brain has a maximum capacity for storage and use of programs (called programming capacity). Each program is given a size quantification on the program tables. A robot may contain any number of programs as long as total size of the programs does not exceed the program capacity.

A robot has access to all programs in its brain at all times, and may use any or all of them simultaneously, as long as the two do not actually interfere with each other.

The programs table lists a number of representative programs, their sizes, and the costs to purchase them initially or to have a robot reprogrammed with them, and any equipment necessary to do the job for which the program is intended.

The descriptions below give the minimum equipment requirements for a given program. Other equipment may be added if desired.

Referees will undoubtedly wish to devise programs of their own. The following definitions and descriptions will serve as a guide.

The following programs duplicate skills found in Traveller book 1.The basic program is equal to the first level of a particular skill (i.e. pilot-1, and so on). Additional levels of skill may be added at additional cost and increased space. Details are given under the add'l level columns of the programs table.

Pilot: Permits the robot to function as a pilot, as per book 1, p. 19. Requires two light work arms or direct interface with controls.

Navigator: Permits the robot to function as a navigator per book 1, p. 19. Requires two light work arms or direct interface with controls.

Steward: Permits the robot to function as a steward per book 1, p. 19. Requires one light work arm (two preferred) and voder/vocorder.

Medical: Permits the robot to act as a medic, per book 1, p. 20. Two light work arms are required.

Air/raft: Permits the robot to operate an air/raft, per book 1, p. 16. Requires two light work arms or direct interface.

Ship's Boat: Permits the robot to operate a ship's boat per book 1, p. 17. Requires two light work arms or direct interface.

ATV and AFV: Permits the robot to operate either an ATV or an AFV per book 1, p. 17. Requires one light work arm or direct interface.

Gunnery: Permits the robot to act as a starship gunner per book 1, p. 19. Requires two light work arms or direct interface.

Electrical: Permits the robot to operate, maintain and repair electronic devices per book 1, p. 18. Requires two light work arms and proper tools.

Mechanical: Permits the robot to operate, maintain and repair mechanical devices per book 1, p. 18. Requires two light work arms and proper tools.

Engineering: Permits the robot to operate and repair jump and maneuver drives and to operate, maintain, and repair starship power plants per book 1, p. 20. This program requires two light work arms and the proper tools.

The remaining programs do not duplicate any particular skill, but are job programs. They cannot be added to or expanded in any way.

General Vehicle: Permits the robot to operate most classes of land vehicle (such as AFV, ATV, automobile, etc). This does not include primitive or specialized vehicles. Requires two light work arms or direct interface.

Valet: Permits the robot to act as a body servant, laying out clothes, cooking, running errands, and so on. Requires two light work arms and general human shape.

Weapon Handling: Permits the robot to operate and maintain any weapon, similar to Gun Combat skill in Mercenary. Restricted to one type of weapon. Light work arm optional if weapon is installed.

General Weapon Handling: As above, but not restricted to one weapon. Requires at least one light work arm.

Zero-G Movement: Permits the robot to move in zero or low gravity conditions by using handholds, thrusters, and so on. Zero-G movement package useful, but not required.

Minimum Security: Permits the robot to act as a security guard for minimum security installations. The robot will patrol a specified area at irregular intervals and report any unauthorized personnel or extra-ordinary events such as fire, etc. Weapon and enhanced vision equipment are advantageous, but not required.

Medium Security: As minimum security, but the robot will detain any unauthorized personnel entering a specified area. Weaponry and enhanced vision are required.

Maximum Security: As medium security, but the robot will fire on unauthorized personnel entering a specified area. Weaponry and enhanced vision are required.

Ground Combat, Infantry: Gives the robot the rudiments of ground combat, permitting it to act as an infantryman. Weapon required, enhanced vision is advantagous.

Ground Combat, Armored: As above, but the robot is acquainted with armored and vehicular combat. This program includes AFV skill. Weapon optional but two light work arms or direct interface required.

Fire-fighting/Rescue: This program permits the robot to battle all forms of conflagration, to rescue humans from disasters, and to administer rudimentary first aid. One light and one medium work arm are required.

Cargo Handling: Permits the robot to load and unload space ships, starships, helicopters, boats, and other air and ground vehicles. Medium or heavy work arms are required depending upon the exact nature of the tasks.

The above list should not be taken as comprehensive. Other programs are certainly possible. The referee should use the above descriptions as a guide in formulating any new programs or changes in old ones.

ROBOT'S RULES OF ORDER

What follows is a quick rundown on using robots in Traveller. Most of the specifics are left up to the individual referee. He or she should decide the role that robots are to play in his or her personal universe.

Movement: The movement ability of a robot depends upon the mass and the type of locomotory apparatus of the individual robot. The movement table gives the maximum speed over various terrain types for wheels, tracks, and a/g units. Leg equipped robots of chassis I through V move at the same rate as humans and are subject to the same restrictions (see book 1, pp. 28-29).

Leg equipped robots of chassis types VI through VII move at half human speed, and are prohibited from rough terrain and areas such as swamps or bogs (due to their high ground pressure, they become mired down more readily than those equipped with tracks or wheels). Wheeled robots, tracked robots, and a/g robots should be thought of as AFV's, ATV's, and air/rafts respectively, as an aid in determining how terrain and other factors affect their movement.

For the purposes of *Snapshot,* consider robots to have 20 action points. Other restrictions will have to be decided upon depending on the size and nature of the robot.

Combat: Unless specially armored, robots are as easily damaged as humans by combat. Combat involving robots should be adjudicated as per book 1, but with the following modifications:

The basic throw to hit is the same for robots as for humans. This throw should be modified according to the robot's size and other factors.

A robot is considered to be armored as if it were a human wearing cloth. After determining that the robot was hit and the total points of damage done, the referee should determine what portion of the robot was hit. To do this, roll two six-sided dice, and compare the results with the following:

2 = Brain
3-4 = Locomotory App.
5-6 = Work arms, if present, otherwise locomotory apparatus
7-9 = Power Plant
10 = Weapons, if present, otherwise power plant
11 = Sensors
12 = Commo Gear

If a brain receives damage points, it is destroyed, and the robot ceases to function.

If a locomotory apparatus takes damage, the extent of the damage will vary with the size of the unit. Consult the table below.

If commo gear or sensors take damage, divide the damage points among all components in that classification. If a particular piece of equipment takes one point or less of damage, it is reduced to 50% effeciency (what this means in game terms is up to the referee to decide). If it takes more than one point damage, it is reduced to 10% effeciency. If it takes two or more points damage, it is destroyed.

If a power plant takes one hit per 5

DAMAGE TO LOCOMOTORY APPARATUS

Type:			*Points of damage inflicted:*
Wheels I-III	2-4	5-8	9+
Wheels IV-V	3-5	6-9	10+
Wheels VI-VII	4-6	7-10	11+
Legs I-III	1-3	4-7	8+
Legs IV-V	2-4	5-8	8+
Legs VI-VII	3-5	6-9	10+
Tracks I-III	3-5	6-9	10+
Tracks IV-V	4-6	7-10	11+
Tracks VI-VII	5-7	8-11	12+
A/G I-III	1	2-5	6+
A/G IV-V	2	3-6	7+
A/G VI-VII	3	4-7	8+
	-50% speed	*-75% speed*	*Loc. app. destroyed*

kilograms of its mass, its power output is reduced to 50%. If it takes three hits per 5 kilograms of its mass, it is reduced to 10%. Four hits per 5 kilograms destroys the power plant. Each time a power plant is hit, there is a chance that it will explode, destroying the robot. Roll 2D for 11+ each time a power plant is hit.

A work arm is reduced to 50% lifting capacity when it takes 3 points of damage if light, 6 points if medium, and 9

PROGRAMS

	BASIC LEVEL		ADD'L LEVEL	
Programs:	*Space:*	*Cost:*	*Space:*	*Cost:*
Pilot	2	5	.4	1
Navigator	2	5	.4	1
Steward	1	3	.2	1
Medical	2	5	.5	1
Air/raft	1	4	.4	1
Ship's Boat	1	4	.4	1
ATV & AFV	.7	3	.4	1
Gunnery	1	4	.3	1
Electrical	1	4	.2	1
Mechanical	1	4	.2	1
Engineering	2	4	.4	1
General Vehicle	2	4	–	–
Valet	1	3	–	–
Weapon Handling	.5	3	–	–
General Weapon Handling	1	4	–	–
Zero-G Movement	.5	2	–	–
Minimum Security	1	2	–	–
Medium Security	2	3	–	–
Maximum Security	2.7	3	–	–
Ground Combat, Infantry	2.5	4	–	–
Ground Combat, Armor	3	5	–	–
Fire-fighting/Rescue	2	2	–	–
Cargo Handling	1	2	–	–

Cost is in 100 credits

MOVEMENT (kms/hour)

		Terrain Type		
Chassis Type:	*Road:*	*Cross-country:*	*Rough:*	*Mountainous:*
Wheels I-II	150	75	40	20
Wheels III-V	120	50	20	10
Wheels VI-VII	100	30	10	prohibited
Tracks I-III	75	40	40	30
Tracks IV-V	50	20	30	10
Tracks VI-VII	40	15	20	5
A/G I-VII	200	200	200	200

Terrain equivalents (see book 3, p 26)

Cross Country = clear, desert, plains, beach, shore.

Rough = hills, foothills, forest, woods, jungle, rainforest, swamp, marsh.

points if heavy. It is reduced to 10% lift if it takes 6, 9, and 12 points respectively. Any further points destroy the arm.

Other aspects of combat must be worked out by the referee.

Maintenance: All robots require maintenance twice per year. This must be done on a planet of at least Tech level 12. Maintenance costs Cr500 plus the cost of any replacement parts needed. Damaged parts may be repaired at a cost of one-half original purchase price.

Additional Components: The following additional components are available:

Armor: A robot may be equipped with the equivalent of reflec armor at a cost of Cr100 per 100 kg total mass, at no additional mass. A robot may be equipped with the equivalent of battle dress at a cost of Cr500 per 100 kg of total mass. Uparmoring in this way increases the weight of the chassis by four, and must be done when first built.

Zero-G Movement Package: A set of gas-operated maneuver thrusters and magnets which permits a robot to operate in a zero gravity environment.

Direct Instrument Interface: The robot's circuits are connected to the control circuits of a ship or vehicle. Both the robot and the vehicle must be prepared ahead of time, at a cost of Cr1500 per ship or vehicle. A player with mechanical expertise can make the necessary connections with the needed components costing Cr750. The interface may be broken or reconnected at any time. This arrangement has the advantage of faster information transfer (and thus, reaction time), giving the robot a better chance to avoid mishaps.

ANTHROPOMORPHISM

Robots can be made to generally resemble humans in shape (two arms, two legs, head, torso, etc.). This is usually done when the robot is to spend a great deal of time amongst humans, or where it must use human tools and furniture. At increased expense and loss of flexibility, robots can be built to be almost indistinguishable from humans.

There are, of course, restrictions:

—The robot must be built on chassis types I, II, or III and no others, using legs for locomotion.

— It may incorporate internally no weapon other than a body/snub pistol, at twice normal cost. This weapon may be concealed only in the hand or chest.

— It must allocate 10% of the total unit mass available to smooth contours and external covering.

— Chassis, brain, and power plant costs are doubled for such robots.

Referees will have to devise their own rules to cover such creations.

FINAL NOTES

After the publication of the Robots articles, reader Terry Scofield wrote to suggest the following rules changes:

"Any size power plant may be built, (within reason) to fit individual needs, at a 20% greater expense than for standard models. The table below was designed assuming that power output equals mass and that the cost equals the cube root of the quantity output times Cr500 (plus 20% for non-standard).

Plant Output & Mass:	*Cost (Cr1000):*
5	0.85
10	1.08
15	1.23
20	1.36
25	1.46
30	1.55
40	1.71
75	2.11

Another change we suggest is to try making the light work arm 5 kg instead of 10. Other arms are unchanged.

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